

R E P O R T

FROM THE

SELECT COMMITTEE

ON THE

SALMON FISHERIES (IRELAND) ACTS AMENDMENT BILL;

TOGETHER WITH THE

PROCEEDINGS OF THE COMMITTEE,

M I N U T E S O F E V I D E N C E,

APPENDIX, AND INDEX.

*Ordered, by The House of Commons, to be Printed,
31 May 1892.*

L O N D O N :

PRINTED FOR HER MAJESTY'S STATIONERY OFFICE,
BY EYRE AND SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.

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SALMON FISHERIES (IRELAND) ACTS AMENDMENT BILL.

Ordered,—[*Thursday, 18th February 1892*]:—THAT the Salmon Fisheries (Ireland) Acts Amendment Bill, be read a second time, and committed to a Select Committee.

Committee nominated—[*Friday, 4th March 1892*]:—of—

| | |
|--------------------|--------------------|
| Mr. Cox. | Mr. O'Neill. |
| Sir John Ellis. | Mr. Finkerton. |
| Mr. Finucane. | Mr. T. W. Russell. |
| Mr. Hayden. | Mr. Seton-Karr. |
| Mr. Hooper. | Dr. Tanner. |
| Mr. Macartney. | Mr. Tomlinson. |
| Mr. John O'Connor. | |

THAT the Committee have power to send for Persons, Papers, and Records.

THAT Five be the Quorum of the Committee.

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R E P O R T.

THE SELECT COMMITTEE to whom the SALMON FISHERIES (IRELAND) ACTS AMENDMENT BILL was referred, have considered the said Bill, and taken Evidence thereon, which they have agreed to report to the House, and have gone through the Bill, and made Amendments thereunto.

31 May 1892.

PROCEEDINGS OF THE COMMITTEE.

Thursday, 10th March 1892.

MEMBERS PRESENT:

Sir John Ellis.
Mr. Tomlinson.
Mr. T. W. Russell.
Mr. Hosier.

Mr. Macartney.
Mr. Seton-Karr.
Mr. John O'Connor.
Mr. O'Neill.

Sir JOHN WHITTAKER ELLIS was called to the Chair.

The Committee deliberated.

[Adjourned till Tuesday, 22nd instant, at Twelve o'clock.

Tuesday, 22nd March 1892.

MEMBERS PRESENT:

Sir JOHN WHITTAKER ELLIS in the Chair.

Mr. Hosier.
Mr. Cox.
Mr. Pinkerton.
Mr. O'Neill.
Mr. Macartney.

Mr. T. W. Russell.
Mr. Tomlinson.
Mr. Hayden.
Mr. Seton-Karr.

Mr. C. J. Webb and Mr. John Dismore were examined.

[Adjourned till Friday next, at Twelve o'clock.

Friday, 25th March 1892.

MEMBERS PRESENT:

Sir JOHN WHITTAKER ELLIS in the Chair.

Mr. Cox.
Mr. Pinkerton.
Mr. O'Neill.
Mr. Macartney.

Mr. Tomlinson.
Mr. T. W. Russell.
Mr. Seton-Karr.
Mr. Hayden.

Mr. Lockhart Arthur, Mr. Alexander Basil Wilson, Mr. Cornelius Cadie, Mr. Maxwell Gauld, and Mr. William Gilson, were examined.

[Adjourned till Tuesday next, at Half-past Twelve o'clock.

Tuesday, 29th March 1892.

MEMBERS PRESENT:

Sir JOHN WHITTAKER ELLIS in the Chair.

Mr. Cox.
Mr. Pinkerton.
Mr. O'Neill.
Mr. Macartney.
Mr. T. W. Russell.

Mr. Tomlinson.
Mr. Seton-Karr.
Mr. Hayden.
Dr. Tanner.

Mr. S. J. Robinson, Mr. Abraham Shackleton, Mr. R. P. Carse, and Mr. C. J. Webb, were examined.

[Adjourned till Friday next, at Twelve o'clock.]

Friday, 1st April 1892.

MEMBERS PRESENT:

Sir JOHN WHITTAKER ELLIS in the Chair.

Mr. Seton-Karr.
Mr. Hayden.
Mr. Pinkerton.
Mr. Macartney.

Mr. Cox.
Mr. O'Neill.
Dr. Tanner.
Mr. T. W. Russell.

Mr. TOMLINSON took the Chair.

Mr. J. McDermott was examined.

Room cleared. The Committee deliberated.

Motion made, and Question proposed, "That evidence as to the erection, construction, and maintenance of weirs, does not come within the scope of the Bill which has been referred to this Select Committee, inasmuch as in all fishing legislation in England, Scotland, and Ireland, there are distinct clauses referring to drains and weirs, or weirs, and distinct clauses referring to water-courses, cuts, channels, or sluices constructed for the purpose of conveying water on the river, and that the Bill referred to the Select Committee, neither repeals nor affects any of the clauses in the existing legislation relating to dams or weirs"—(Mr. Macartney).—Motion, by leave, withdrawn.

Mr. McDermott was further examined.

Mr. E. Moles was examined.

[Adjourned till Tuesday next, at One o'clock.]

Tuesday, 5th April 1892.

MEMBERS PRESENT:

Sir JOHN WHITTAKER ELLIS in the Chair.

Mr. Macartney.
Mr. Seton-Karr.
Mr. Hosier.
Mr. Cox.
Mr. Finucane.
Mr. Hayden.

Mr. O'Neill.
Mr. Pinkerton.
Mr. T. W. Russell.
Mr. Tomlinson.
Dr. Tanner.

Mr. Moles was further examined.

[Adjourned till Friday, 29th April, at Twelve o'clock.]

Friday, 29th April 1892.

MEMBERS PRESENT:

Sir JOHN WHITTAKER ELLIS in the Chair.

Mr. Macartney.
Mr. Seton-Karr.
Mr. Tomlinson.

Mr. T. W. Russell.
Mr. Hosier.
Mr. O'Neill.

Mr. T. G. Hollett was examined.

[Adjourned till Monday next, at Twelve o'clock.]

Monday, 2nd May 1892.

MEMBERS PRESENT:

Sir JOHN WHITTAKER ELLIS in the Chair.

Mr. Macartney.
Mr. Seton-Karr.
Mr. Tomlinson.

Mr. Cox.
Mr. O'Neill.

Mr. W. Petrie, Colonel Edward Cooper, and Mr. K. L. Moore, were examined.

[Adjourned till Friday next, at Twelve o'clock.]

Friday, 6th May 1892.

MEMBERS PRESENT:

Sir JOHN WHITTAKER ELLIS in the Chair.

Mr. T. W. Russell.
Mr. Seton-Karr.
Mr. Tomlinson.
Mr. Cox.

Mr. Pinkerton.
Mr. O'Neill.
Mr. Macartney.

Mr. K. L. Moore was further examined.

Mr. Richard Hassard was examined.

[Adjourned till Tuesday next, at Half-past Twelve o'clock.]

Tuesday, 10th May 1892.

MEMBERS PRESENT:

Sir JOHN WHITTAKER ELLIS in the Chair.

Mr. Seton-Karr.
Mr. Tomlinson.
Mr. Macartney.
Mr. Cox.

Mr. Hosier.
Mr. Pinkerton.
Dr. Tanner.

Mr. Richard Hassard, Mr. Richard Foley, and Mr. John MacDonald, were examined.

[Adjourned till Friday next, at Twelve o'clock.]

Friday, 13th May 1892.

MEMBERS PRESENT:

Sir JOHN WHITTAKER ELLIS in the Chair.

Mr. Macartney.
Mr. Pinkerton.

Mr. Seton-Karr.
Mr. Tomlinson.

Mr. G. R. Bodner, Mr. K. L. Moore, Mr. James O'Toole, and Mr. James Patterson, were examined.

[Adjourned till Tuesday next, at Half-past Twelve o'clock.]

Tuesday, 17th May 1892.

MEMBERS PRESENT:

Sir JOHN WHITTAKER ELLIS in the Chair.

Mr. Seton-Karr.
Mr. Tomlinson.
Mr. O'Neill.

Mr. Pinkerton.
Mr. Cox.

Mr. A. Moore Munn was examined.

[Adjourned till Friday next, at Twelve o'clock.]

Friday, 20th May 1892.

MEMBERS PRESENT:

Sir JOHN WHITTAKER ELLIS in the Chair.

Mr. Pinkerton.
Mr. Macartney.
Mr. Hozier.
Mr. Cox.

Mr. Tomlinson.
Mr. Seton-Karr.
Mr. Hayden.

Mr. James Perry, Mr. Macartney (a Member of the Committee), and Mr. Willis Bond, q.c., were examined.

Mr. K. L. Moore was further examined.

[Adjourned till Tuesday next, at Twelve o'clock.]

Tuesday, 24th May 1892.

MEMBERS PRESENT:

Sir JOHN WHITTAKER ELLIS in the Chair.

Mr. Macartney.
Mr. O'Neill.
Mr. Pinkerton.
Mr. Seton-Karr.

Mr. Tomlinson.
Mr. Hayden.
Mr. Cox.

Sir Thomas Brady was examined.

[Adjourned till Friday next, at Twelve o'clock.]

Friday, 27th May 1892.

MEMBERS PRESENT:

Sir JOHN WHITTAKER ELLIS in the Chair.

Mr. Seton-Karr.
Mr. Tomlinson.
Mr. Macartney.

Mr. Hozier.
Mr. O'Neill.
Mr. Cox.

Sir Thomas Brady, Mr. W. G. Pollerfen, Mr. James Wotherspoon, Mr. C. J. Webb, and Mr. A. B. Wilson, were examined.

[Adjourned till Tuesday next, at Eleven o'clock.]

Tuesday, 31st May 1892.

MEMBERS PRESENT:

Sir JOHN WHITTAKER ELLIS in the Chair.

Mr. Macartney.
Mr. Tomlinson.
Mr. Seton-Karr.

Mr. O'Neill.
Mr. Hozier.

Mr. Alon Hornsby was examined.

Room cleared.

Clauses 1—2, agreed to.

Clauses 3—7, disagreed to.

New Clause ("Acts repealed")—(Mr. Macartney)—added.

New Clause ("Gratings in water-courses of mills, &c., not worked by turbines")—(Mr. Macartney)—added.

New Clause ("Power of exemption by inspectors")—(Mr. Macartney)—added.

New Clause ("Gratings in water-courses of mills, &c., worked by turbines")—(Mr. Macartney)—added.

New Clause ("Power of exemption by inspectors")—(Mr. Macartney)—added.

New Clause ("Appeal by any person aggrieved by the decision of the Inspectors of Fisheries")—(Mr. Macartney)—added.

New Clause ("Board may place gratings at mouths of streams")—(Mr. Macartney)—added.

New Clause ("Incorporation of Acts")—(Mr. Macartney)—added.

New Schedule added.

Ordered, To Report the Bill, as amended, together with the Minutes of Evidence and an Appendix to the House.

EXPENSES OF WITNESSES.

| NAME OF WITNESS. | PROFESSION or CONDITION. | From whence Summoned. | Number of Days Absent from Home under Orders of Committee. | Absence during absence from Home. | Expense of Journey to London and back. | TOTAL Expense allowed to Witness. |
|------------------------|--|--------------------------|--|--|---|--|
| | | | | £. s. d. | £. s. d. | £. s. d. |
| Charles J. Webb | Milowner | Bandstown, co. Antrim | 4 | 4 4 - | 5 0 0 | 9 10 0 |
| John Dunne | Milowner | Ballymena, co. Antrim | 4 | 4 4 - | 5 0 0 | 9 10 0 |
| Arthur Lachlan | Manufacturer | Ballymena, co. Antrim | 4 | 4 4 - | 5 0 0 | 9 10 0 |
| Alexander Wilson | Engineer | Holywood, co. Down | 3 | 6 0 - | 4 17 - | 11 3 - |
| Conradia O'Lea | Manufacturer | Dublin | 3 | 3 5 - | 4 10 - | 7 15 - |
| Maxwell Gault | Milowner | Ballymena, co. Antrim | 4 | 4 4 - | 5 0 0 | 9 10 0 |
| William Gibson | Milowner | Ballymena, co. Antrim | 4 | 4 4 - | 5 0 0 | 9 10 0 |
| Stuart John Robinson | Milowner | Cullybackey, co. Antrim | 4 | 4 4 - | 5 0 0 | 9 10 0 |
| Abraham Shackleton | Milowner | Dublin | 3 | 3 0 - | 3 - - | 6 0 - |
| R. F. Carr | Merchant | Manchester | 3 | 9 2 - | 8 14 - | 4 10 - |
| J. McDermott | Inspector of Fisheries | Londonderry | 5 | 5 5 - | 6 0 - | 10 15 - |
| Edward Miles | Water Constable | Ballymena | 7 | 3 10 - | 4 4 - | 7 10 - |
| William Fehle | Salmon Fishery Owner | Gilga | 6 | 6 5 - | 6 10 - | 12 9 - |
| E. L. Moore | Salmon Fishery Owner | Londonderry | 10 | 10 10 - | 6 14 6 | 16 4 6 |
| Mr. Richard Foley | Salmon Fishery Owner | Llennore (Ireland) | 4 | 4 4 - | 4 - - | 8 4 - |
| Mr. James O'Toole | Civil Engineer | Cork | 4 | 10 12 - | 4 4 6 | 14 16 6 |
| Mr. A. Moore Mann | Solitor | Londonderry | 5 | 10 10 - | 5 10 6 | 15 9 6 |
| Mr. James Prou | Civil Engineer | Galway | 6 | 16 18 - | 6 10 - | 22 8 - |
| Sir Thomas Bredy | Inspector of Salmon Fisheries. | Dublin | 3 | 3 3 - | 5 - 0 | 8 3 0 |
| | Experiments carried on in Ireland under special sanction of the Treasury | | | | - - - | 50 10 0 |
| Mr. James Waterhouse | Milowner | Gilga | 4 | 2 - - | 3 13 6 | 6 10 0 |
| Mr. George Peltin | Milowner | Gilga | 4 | 4 4 - | 6 17 9 | 11 2 0 |
| Mr. Charles James Webb | Milowner | Bandstown, co. Antrim | 8 | 6 8 - | 10 18 - | 19 1 - |
| Mr. A. B. Wilson | Engineer | Holywood, co. Down | 3 | 6 8 - | 4 17 - | 11 3 - |
| Mr. Alan Barnaby | Inspector of Fisheries | Dublin | 6 | 6 8 - | 10 1 - | 16 7 - |
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MINUTES OF EVIDENCE.

Tuesday, 22nd March 1892.

MEMBERS PRESENT :

Mr. Cox.
Sir John Whittaker Ellis.
Mr. Hayden.
Mr. Macartney.
Mr. O'Neill.

Mr. Pinkerton.
Mr. T. W. Russell.
Mr. Seton-Karr.
Mr. Tomlinson.
Mr. Hozier.

SIR JOHN WHITTAKER ELLIS, BART., IN THE CHAIR.

MR. CHARLES JAMES WEBB, called in ; and Examined.

Mr. Macartney.

1. You reside at Bandalstown, do you not ?—
Yes.

2. You are a magistrate for the county, I believe ?—I am.

3. Do you carry on business there ?—I carry on business as a linen manufacturer and bleacher.

4. What is the name of your firm ?—The Old Bleach Linen Company is the name of the firm I am connected with.

5. How many years have you been carrying on business there ?—About 25 years I have been there.

6. You are also the Honorary Secretary of the County Antrim Mill-owners' Association, are you not ?—Yes, I am honorary secretary of that association.

7. I believe that association was founded in consequence of certain prosecutions which were commenced in the year 1889 ?—Yes.

Chairman.

8. Against the mill-owners ?—Yes.

9. Who by ?—By the Board of Coleraine Conservators.

Mr. Macartney.

10. Some eight or nine or 10 of the principal mill-owners were prosecuted, were they not ?—Yes.

11. Over and over again, repeatedly ?—I was prosecuted over and over again, and some of the others, I think, were prosecuted once, and some of them on several occasions.

12. The object of these prosecutions was to force the mill-owners to put gratings at head and tail races, and wire nettings over the lattices in front of the turbine wheels. Is that a short way of putting it ?—That does not cover it entirely.

Q.80.

Mr. Macartney—continued.

13. Perhaps you will state it to the Committee in your own way ?—What I was prosecuted for, and called upon to erect, was a grating at the head race about half-a-mile from my works.

Chairman.

14. At the head of the mill-race ?—At the head of the mill-race. Also a netting at the head of the mill-race in front of the grating, or covering the grating, a grating at the tail-race and nettings before the two turbine wheels.

Mr. Macartney.

15. There being already there gratings ?—There being already there gratings.

16. Now previous to these prosecutions of the year 1889, had there been any attempt while you were carrying on your business there, to your knowledge, to enforce the provisions of the Statutes for these particular purposes ?—I remember receiving a notice, I think it was about the year 1873, or somewhere about that time, directing that similar gratings and nettings should be erected.

17. What was the result of that notice ?—The inspectors called at my place.

Chairman.

18. The Inspectors of the Conservancy ?—No ; I think it was the Inspectors from Dublin ; the Inspectors of Fisheries it must have been. I was not at home myself, but I know as a matter of fact they did call.

Mr. O'Neill.

19. That was about 1873, you say ?—I think
A.

80.

22 March 1892.]

Mr. WERR.

[Continued.]

Mr. O'Neill—continued.

so It was after the passing of the Act of 1869. It was about 1873, so the best of my recollection, but I cannot find any record of it, as the notices were made verbally by the local inspectors.

Mr. Macartney.

20. Were any steps taken then?—No. The Inspector informed me that he had decided it would injure the water power, and they withdrew any notice they had given me, and other mill-owners up the river were treated with the same consideration.

21. The Acts affecting the mill-owners in connection with the fisheries are, I believe, 5 & 6 Vict. c. 103, 25 & 27 Vict. c. 114, and 32 & 33 Vict. c. 9?—Yes, those are the Acts of 1863 and 1868.

22. How many mill-owners are there in the association?—On local association?

23. Yes, your local association?—About 26.

24. Their works are all situated on the River Main and its tributaries, are they not?—Yes.

25. The River Main itself is a tributary of the River Bann, is it not?—Yes.

26. I believe you are an angler yourself?—Yes, I used many a time to angle in the river, but I have not lately; I have too much to attend to; but I am an angler, and I understand the habits of fish.

27. You know that salmon frequent the Main, do you not?—Yes.

28. During the period you have carried on your business there, have you observed whether or not there has been an increase or decrease in the fishing?—Certainly there has been a decrease in the fishing and the angling. The angling is not so good as it was 20 years ago.

29. So, judging from that, at all events you think there probably is a decrease?—I think so; I fancy there is a decrease of fish.

30. Can you suggest any reasons for that?—Yes, I believe one reason undoubtedly is the growth of the Canadian weed which has destroyed salmon fisheries. It has been gradually creeping up the river. It is a weed that came over from Canada, and has got up the river and has destroyed the salmon fishing in other rivers.

31. What is commonly called the American weed?—Yes.

32. That has increased enormously, has it not?—Yes, it has. Above my dam, for a mile up, there are masses of it. It nets the fish, and sometimes the fish are found caught in it killed. It practically stops up rivers for the passage of fish.

33. That is one suggestion. Can you give us any other, with regard to poaching, for instance?—Again, there is the wholesale poaching which is carried on along the whole length of the river owing to the neglect of the fishery authorities.

34. Upon this point I believe you were very active in endeavouring to put down, some years ago, the poaching which took place?—Yes, I always have been. I did far more than anyone else in the neighbourhood, or the official conservators themselves, to put a stop to illegal poaching.

35. And in consequence you aroused the dislike of the gentlemen who carried on those operations, and you had a portion of your mill burned down?—Yes, I had 3,000 l. worth of my property burned down maliciously. I, in conjunction with Sir Edward Harland, stopped up

Mr. Macartney—continued.

the net holes with concrete blocks on my property, which they were in the habit of dragging, and the same night my premises were maliciously set on fire, for which I recovered 1,900 l. off the county.

36. With regard to the increase of pike in the Main, are you able to speak at all as to that?—Yes. Formerly there were no pike in the Main, it is now full of them.

37. Of course they are very destructive?—Yes. Then again, I cannot say it of my own absolute knowledge, but from what I have been informed by gentlemen connected with the fisheries, there is a much more complete system of engines for catching the fish at the legitimate fisheries along the river. I am told that they catch a larger number of fish than they ought to catch.

38. At all events they are killing more salmon now than they killed before; you have heard that?—Yes; more in proportion to the supply. I cannot say that of my own knowledge.

Mr. T. W. Russell.

39. You do not know that of your own knowledge?—No.

Mr. Macartney.

40. Then with regard to flax water, there has been of late years a considerable increase in the growth of flax in the County Antrim, I believe?—I believe there has.

41. In fact last year it stands at the head. It used to be fourth or fifth in order, but now it is at the head?—No doubt.

42. And so doubt a certain amount of flax water is let off into the rivers?—There is no doubt about it. It cannot be avoided. It may be mitigated, but it cannot be avoided.

43. And it is well known that flax water is absolutely fatal to fish?—Yes.

44. With regard to the result of the prosecution in your cases, you appealed, I believe, in the case brought against you in respect of the turbine?—Yes, I appealed in the Turbine Wheel Case. Shall I give you a statement in regard to that?

45. No, we will take it shortly. You were successful in that appeal, were you not?—I appealed in regard to the first prosecution, which was under the 5 & 6 of Victoria, and then I did not carry out the appeal. I was prosecuted in October, and I paid the fine put upon me in my own court where I sit, and then two prosecutions were issued against me in the beginning of the year, calling upon me to put up these nettings and gratings. I explained to the inspector on several occasions who called upon me, that to put them up would absolutely close my works and throw all my people out of employment, and that there were no fish being injured whatever. I informed him of that fact, and then I appealed to the chief inspectors for exemption in regard to one point on which they could give exemption, and after I had got their acknowledgment, and while they were examining into the question of whether exemption should be given, I had two more criminal prosecutions issued against me for other dates, so that I think I had five, or at least four, prosecutions running at that time altogether. I was convicted again before the sessions; I brought up a Queen's Counsel from Dublin; I went to considerable expense to defend the matter, and I then

22 March 1892.]

Mr. WERN.

[Continued]

Mr. McCarthy—continued.

I then appealed (that was on the Turbine Wheel Case) to the quarter sessions.

46. Where you were successful, I believe?—Where I was successful.

47. You were successful on the facts? That is, the prosecution broke down on the facts?—The prosecution broke down on the facts; they could not prove any injury to fish.

48. They established no case of injury to fish?—No.

49. In any of these cases, speaking generally, and putting it to you as honorary secretary, are you aware of the prosecution having established any injury to fish?—I believe in all the prosecutions that occurred along the entire length of our river there was not a single case in which they attempted to prove injury to fish, or could prove it.

50. You are putting it rather stronger than I put it. Was evidence given that there was injury. Did they establish it?—No, they did not.

51. Have you yourself ever seen any fish go into your turbines?—Never; and I believe it injures no fish whatever.

52. Have you found any fish in the tail-race?—No, never.

53. You have had your turbine-wheel closely watched, have you not?—I have, and I placed a platform below both turbines while the prosecutions were pending against me, and maintained it there six weeks, level with the water; and I called on the Conservators, or their chief inspector, to place a man from evening to night, and to produce a single salmon fry or fish that was injured, and they failed to do so, although they sent a man there to watch, and I had it watched myself. Evidence was given on oath about it.

54. There are about 30 mills in this district worked by water power, are there not?—Yes, fully 30 I should say.

55. Speaking generally, how many hands do they employ, about?—There may be more mills. If you take smaller mills, I think there are 40. They employ variously from 20 to 300 hands each.

56. I mean how many hands are there employed altogether?—Between 2,000 and 3,000, roughly speaking.

57. About 2,500 would be the number altogether, would it not?—Yes.

58. That would represent a population of about 10,000 people or so depending upon the industry?—I would say over 20,000 people.

59. You yourself employ about 300 hands, do you not?—Yes, about 300 hands at full work.

60. And there are other mills which employ over 200 you know?—Yes, most of them are finishing and bleaching mills, where they do not employ a very large number of hands.

61. Can you give the Committee any idea of the average power in, say, 10 or 12 of the largest mills?—I was looking into that, and I think it would come to somewhere about 700 or 800 horse-power.

62. That would be altogether; but what would be the average horse power in 10 or 12 of the largest mills?—I should think between 70 to 100 horse-power. I have over 100 horse-power, and 0.60.

Mr. McCarthy—continued.

another place I know has 160 horse-power, and some others have 30, and so on.

63. Will you tell the Committee what the principal manufacture is which is carried on?—There are two twined manufacturing mills or factories; there are two linen manufactories that I know of; I do not think there are more; and the rest are bleaching and finishing mills.

64. Linen finishing and cotton finishing?—Yes, linen finishing and cotton finishing. They send goods across from Manchester, and finish them there, as well as linen from Belfast.

65. There is one pretty large corn mill there, is there not?—Yes, there is, which turns out a very large quantity.

66. Taking some of the largest concerns, say 10 or so, as to which, I think, you have made some inquiries, what is the value of the goods turned over in a year?—Over 1,500,000. I am not speaking of the corn-milling, because that is a large thing, but simply speaking of the textile goods that go out of the country, and bring money in.

67. You are confining yourself to 10 mills, you are not including the whole number?—No.

Chairman.

68. Ten of the largest turn over 1,500,000, you say?—Yes.

69. When you say "turn over," I suppose finishing means sending in goods to be finished, and turned out again?—Yes.

70. Do you mean that the value of those goods when finished is 1,500,000?—Yes, I do.

71. So that they are not manufactured there?—A great many are; for instance, I manufacture all my goods and bleach them myself and send them to England and the United States.

Mr. T. W. Russell.

72. Do you count the value of the goods that are sent from Manchester to be bleached?—Yes, that is the value of the goods that pass through the mills.

Mr. McCarthy.

73. I believe all these mills use turbines, except one?—Yes, they do. I should say the actual goods in value would be about half that.

74. Your turbine was about the second one which was put up in the river, was it not?—I believe it was.

75. And you have been using it for how many years?—Nearly 14 years, I think.

76. Will you explain to the Committee the particular advantages of the turbine in your business?—The great advantage of the modern turbine, such as we have introduced, is this, that it gives an absolutely steady drive. I consider that it gives a steadier drive than steam, if there is an even water supply, and it is the only hydraulic machine, or hydraulic motor, that is suitable for textile manufacturing. With the old water-wheel, which I attempted myself before I put up the turbines to carry on textile manufacturing, it was impossible to get this steadiness, or to get success at all. On the use of the turbine throughout the south and west of Ireland, I believe, depends the extension of the industries of Ireland. I have proved, as a matter

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Mr. WEBB.

[Continued.]

Mr. Macartney—continued.

matter of fact, that it is as suitable, or, I consider, more suitable, for textile manufacturing than the steam-engine. I have used both the steam-engine, old water-wheel, and turbine wheel, in manufacturing linen goods.

77. In your opinion, could textile manufacturing, such as exists in your neighbourhood, be carried on without its use?—Not successfully.

78. The fact is to a certain extent you compete with Belfast and the power looms, do you not?—Yes.

79. And the machine has enabled you to a great extent to do that?—With the turbine we can weave the very finest goods, which you cannot do without a perfectly steady drive. At our places we weave the finest goods that come into the market, but we were totally unable to do so until we had the turbine wheels. Perhaps I might explain the way the steadiness of drive is affected by these nettings and close gratings. There is always, of course, a very considerable amount of floating debris coming down the river. There is also floating matter in our river from the scutch mills above, and leaves, and so forth. Those accumulate at these nettings or gratings, and although under certain circumstances they can be scraped off when they accumulate, in the meantime they check the flow of water, and the turbine begins to go slower, or the wheel begins to go slower.

Mr. T. W. Russell.

80. Because the flow of water is impeded?—Because the flow of water is impeded.

Mr. Macartney.

81. Your head-race is half-a-mile long, is it not?—It is. Those erections, for instance, that I had to put up would have absolutely stopped three-fourths of my established water flow, for which I was paying. Besides which, there was the accumulation of the floating debris and stuff that gathered upon it which would stop it altogether.

82. There is a great deal of debris coming down the main, is there not?—A tremendous amount. I have seen mills myself higher up which have been absolutely stopped, and the heads all thrown out.

83. The average length of most of the head-races is half-a-mile, is it not?—Some are considerably longer and some shorter.

84. You have now three large sluices at the head, have you not?—Yes.

85. Even with no grating or lattices, or any other artificial impediment in the water, have you ever seen the intake there choked by debris coming down?—Yes, last winter; although the spaces are three feet wide it was completely stopped up without any grating or setting of any description, and the mills thrown idle, owing to branches that caught the debris, and it took us an hour, I suppose, to take the stuff out in front of the gates; we took out about two cart-loads.

Mr. T. W. Russell.

86. Then do I understand you have complied with the law?—No, I have not. It was simply these head gates. The law required me to put

Mr. T. W. Russell—continued.

up a netting and a close grating, but instead of that I had four gates across, of about 3 feet or 2 feet 6 inches wide, and it was this space of 2 feet 6 inches which was jammed up and stopped the water, without any nettings or gratings at all. That has frequently occurred. Of course it is only when there are floods on, and there is high water in the winter time, that that is so.

Mr. Macartney.

87. With regard to the wire netting, what size are the meshes?—They have power under the Irish Act to force us to put any mesh. A 16th mesh, if they please.

88. What do they absolutely require?—The netting I got required $\frac{3}{4}$ ths of an inch. I think it was a $\frac{3}{4}$ before.

89. That, of course, even without any accumulation of stuff, would almost immediately destroy your water power, would it not?—The series of nettings and gratings which I was required to put up would have reduced my water power by three-fourths.

90. Independent of any accumulation that had come down?—Yes; it would have closed my place, and deprived the people of employment if I had put them up.

Mr. T. W. Russell.

91. To put it shortly, if you had complied with the law?—Yes.

Mr. Cox.

92. Is it the Local Board of Conservators, or the inspectors, who require this?—The local inspector summoned me, the official of the Conservators.

Mr. Macartney.

93. The summonses were issued in the name of Edward Meale, were they not?—They were issued in the name of Meale, the local inspector. They were not issued in the name of the inspectors or in the name of the Conservators, and we could not for months ascertain who was prosecuting us, and I did not know until the question was put by counsel in court as to who we were being prosecuted by.

94. Now you pay for the use of the water under a lease, do you not?—Yes; I pay a rent practically for the water power.

95. And having acquired the use of the water by a payment of money, you find that the Conservators have stepped in and, by acting under the provisions of these Statutes, practically deprived you of the necessary power to carry on your work?—If I had carried out the demands that were made it would have confiscated my property, and, in fact, would have ruined the village I live near. I could not have remained there, and would not have remained.

96. I believe when you came to reside in Randalstown it was much smaller than it is now?—Yes; there was no work there at that time.

97. There are absolutely no houses unoccupied there now, are there?—No; half the houses in the neighbourhood were empty, and now we have not enough houses.

98. In fact there is rather an extensive building operation going to be carried out, is there not?

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MR. WREED.

[Continued.]

Mr. Macartney—continued.

not?—Yes, I hope so; the people have full employment all round.

99. Your objection to the law as it stands is that it enables the Conservators to call upon millowners to put up a combination of gratings and wire nettings which would absolutely close the works by depriving them of necessary water power, would it not?—Yes.

Mr. T. W. Russell.

100. And not only that the law enables them to do that, but that they have required you to do it?—Yes, they have required me to do it.

Chairman.] I think we have had it before. The witness has said: "If I carry out the regulations I could not carry on my business."

Witness.] Yes.

Mr. Macartney.

101. Your association, I think, also object to the fact that the Conservators are practically independent of the Commissioners?—Yes; we consider that an evil. I think, from what I saw of Sir Thomas Brady and Her Majesty's Inspectors, they were anxious to do what they could.

Chairman.

102. Do I understand the Conservators are distinct from the Government Inspectors; are these two bodies, a Board of Conservators and the Government Inspectors, apart from the Board of Conservators; is that so?—Yes.

103. And are these regulations made by the Board of Conservators or the Inspectors?—These prosecutions do you mean?

104. Yes, the prosecutions or the notices that are served?—I believe they were directed by the Conservators, but, as I say, we did not know who were prosecuting us. We knew simply this man Moulé.

105. You had written notices served upon you, I understand?—Yes.

106. Have you got one with you?—I think I can get you one.

107. We should have liked an original notice?—I have a summons.

Mr. Trevelyan.

108. Who is Edward Moulé?—He is the local inspector. He was a sub-constable, I think. I think they call him head water bailiff.

Mr. T. W. Russell.

109. You stated, in reply to Mr. Macartney in one of your first answers, that your association was founded because of prosecutions commenced in 1889 by the Board of Conservators?—I did.

110. Now, who is this Edward Moulé?—He is employed by the Board of Conservators, and is quite independent of the chief Inspectors.

111. Of the chief Inspectors of Fisheries?—Yes.

112. It is clear then that the prosecutions have been by the Board of Conservators, and I gather that the man who signed the summonses was their agent?—It was not in their name that the prosecution was made; I have here some of the summonses against myself. The point is this: I got my counsel to put that question to Moulé when in the witness box, as to who directed him, &c.

Mr. T. W. Russell—continued.

or under whose authority he was bringing the prosecutions, because he was bringing them simply under the criminal law. I could not give evidence, my mouth being closed as if I were a criminal. He then stated, in reply to my counsel, Mr. Dodd, that he was proceeding by order of the Board of Conservators.

Chairman.

113. What we should like to know is who served the notices upon you to put those gratings and nettings down?—Moulé.

114. The notices were served by Moulé?—Yes, all by Moulé. On that point, perhaps, I might just say this, that what we object to as millowners or as joint-stock companies in such a case as ours is this, that a fishery company, bringing very much less wealth into the country than we bring into it, a private fishery company has practically the power of prosecuting and assailing us under the criminal law for their benefit, assuming that it was for their benefit.

Mr. Macartney.

115. The fact of it is that the Board of Conservators (putting aside the question of any private company) can call upon the millowners to erect at the millowners' expense the gratings and wire nettings, the benefit resulting from which all goes to the interests of the Conservators?—Assuming that there is any benefit.

116. Whereas, in the case of salmon ladders which are equally beneficial and equally necessary in salmon rivers, the Conservators have never attempted to carry out the provisions of the Act, because they are called upon to pay for them themselves; is not that so?—Yes, it is; I have seen that salmon in certain states of the river could not get up my weir at all. I have seen hundreds of them trying to get up, and they could not. They should have a ladder.

117. But you have never been called upon by the Conservators to do that?—No; I would be quite prepared to put it up, but they have never called for it.

Chairman.

118. Would not it be to the interest of the fishery owner to do that; would he not put the ladder there?—The owner of the fishery and the Conservators are practically identical. It is the fishery owners that direct the Board of Conservators, as they are Conservators themselves.

119. Surely the fishery owners would have sufficient interest in assisting the fish to mount the river, and therefore would put the ladder there, would they not?—But they have not done it; they would have to pay for it themselves.

120. What expense would it be to put up a fishery ladder?—In certain cases it would not be very much, but of course it would have to be very solid stonework. It would be of great assistance to the fish. They have them in some of the rivers, the Liffey, and so on. The estimated cost of putting up the erections which they called upon me to put up was somewhere about 1,400 £. It would cost me 1,400 £ out of my own pocket to put up those erections. A much smaller sum would put up the salmon ladder which would be of much greater service to the fish, but they would have to pay for it themselves.

A 3

121. It

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Mr. WERN.

[Continued]

Chairman—continued.

121. It has cost you that, do you say?—No; it would have cost me in the first instance 1,400 £. It is a very large body of water. I had the cost estimated by an engineer.

122. With regard to the Bill that has been referred to the Select Committee, which you have in your hand, do you approve of the provisions contained in that Bill?—Yes.

123. The result of the 3rd Clause of the Bill, if carried, would be to leave the power of exemption applying to millowners which is given in the 76th section of the Act 5 & 6 Vict., would it not?—Originally the Irish law was right, until the Act of 1869 was passed.

124. And you would be satisfied to go back to the state of affairs in the Act of 5 & 6 Vict., with the exemption to millowners in the 76th clause, would you not?—Yes.

125. That repealed the clause as to the turbine, and repeals the clause which repealed the exemption?—In other words we are satisfied to return to the position of the law as under 5 & 6 Vict.

126. There is an exemption given where water is taken for navigation, or as a moving power for machinery?—Yes.

127. That is repealed by the Act of 1869?—Yes.

128. I should like this to be clear; you object to the costs of the works required by the Act being thrown on the millowner, do you?—Yes.

129. And you say the costs of the works to you would be 1,400 £. altogether?—Yes.

Mr. T. W. Swanell.

130. But I thought you objected to the works altogether?—We object to the netting altogether; but under (the proposed) Act, as I understand it, the Conservators have the power of directing gratings to be put up for the protection of fish, but they must put them up at their own expense, and they must also, as under the English Act, make a wider place, so as to give the same water passage, to give the original amount of water to the mill-owner. They must not curtail the established water power for which he has to pay.

Mr. O'Neill.

131. What work were you called upon to do which was estimated to cost 1,400 £.?—The putting up of the grating in front next the river-mess, somewhere about 10 feet deep and of great width, also to put up the nettings, and then to make a very extensive structure in the tail race. In that case a building would be required to sustain it. I think it is 30 feet wide, and I would have to support the grating and put solid stonework to butt it upon, besides a solid wall behind it to prevent the bank being swept away when the water rose, owing to the grating being choked with *débris*.

Mr. Macartney.

132. In fact, you had an engineer's estimate as to that, had you not?—Yes, an engineer gave me a rough estimate of it. I think myself it would have cost more. I mean to say with the loss from stopping any works it would have cost me more.

Mr. Macartney—continued.

133. With regard to this Act of 1869, you have referred to the Debates in Parliament, I believe?—Yes.

134. And, as a matter of fact, that Act was introduced by the Law Officer for the Crown in Ireland as merely an Act to transfer from the Commissioners of Fisheries to the present Inspectors the powers that were then being exercised by the Commissioners, and not one single word was said with regard to any other power?—No, the millowners were not aware it was being repealed. It was tacked on to a formal Act repealing the other Act passed through Parliament, without our knowing anything about it.

Mr. Tomlinson.

135. With reference to the *débris* going down the river, I understand that it is chiefly in flood-time that you have this stoppage?—Chiefly; but there is always a vast amount of *débris* going down the river. Even when there is no flood at all there is a vast amount floating down the river.

136. Apart from any question of grating, is there much difference between the force of the stream in flood times than ordinary times?—Do you mean as to the power?

137. Yes, as to the power?—No. Of course, in flood times there is a surplus of water which we do not require.

138. You can always command a sufficient amount of water to keep your turbine going at proper strength, can you?—Yes.

139. Under all circumstances?—Yes, under all circumstances.

140. Does the *débris* that floats down your mill-race ever interfere with the working of your turbine?—Not to any great extent now, because I have not put the gratings and nettings up.

141. But if there are no gratings, the *débris* would float down the mill-race till it came to your turbine, would it not?—Yes. I have a grating immediately before the turbine, but I have no netting.

142. Does that grating ever become blocked?—Yes, it does sometimes.

143. And that interferes with the working, does it?—At the present time, even with that grating, which is a wide grating, I have sometimes to put two men standing at each side when there is a vast amount of *débris* coming down to clear it away. That is so especially when this American weed is breaking off at a certain season of the year. I have had to put a man standing on each side to break it up, even with a wide grating.

144. Supposing the grating was put at the head of the race instead of there, would any greater amount of labour be required to clear it than is required at your turbine?—Of course it would; it is at a much greater distance from the works, and it is a thing which comes on suddenly.

145. The fact of its being at a greater distance from the works would not increase the labour of keeping it clear, would it?—It would increase it in this way: the moment they find any effect on the power, as in the case I speak of when the American weed comes down, the man who is inside calls one of his hands out and they just go out and clear it; they are close at hand.

146. What

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Mr. Wren.

[Continued.]

Mr. Tweedman—continued.

146. What would happen to any fish that went down your mill-race? would they be stopped by your grating or get into your turbine?—There is a bye-wash, and they can get out if they like. They can swim out just as they came in. They can go up the race and down the race as freely as possible.

147. Is there room to pass your turbine without their being entangled in it?—Yes, ample room.

Mr. Selas-Kerr.

148. Do you get the whole of your water supply from the River Main?—Yes, altogether.

149. You know it, I suppose, to be a river in which salmon breeds pretty extensively?—Yes.

150. It is a good salmon-breeding river, is it not?—Yes, I should think so. I think it is one of three rivers that supply the Bann.

151. Is it the fact that during the months of March, April, and May the flow of water in the river is generally less than at any other time of the year?—It depends. For instance, taking this past March we have had very heavy floods in the river.

152. I am speaking generally?—I should say that, perhaps, there is less water in the river than in the autumn.

153. Is it the fact, speaking generally, in your opinion, that the months of March, April, and May are the months in which there is less water?—I should not say so.

154. What are the months when there is less water?—I should say May, June, and July.

155. During those months of March, April, and May, or May, June, and July, do you take almost the entire flow of the river into your mill-race, except in the case of a flood or a fresh?—I do, that is, in the daytime, not at night, of course. It is flowing down the river at night.

156. But while the mill is working you do?—Yes.

157. Is there anything at your head-race to prevent salmon or other fish going in?—Nothing; never knew a salmon to be caught there; they never do go in.

158. Salmon fry go in, do they not?—Salmon fry, I should say, go in.

159. There is nothing there to prevent it, is there?—No, they go in and go out. I believe it is an absolute protection so far as the salmon fry are concerned when they are small.

160. What is a protection?—They are protected, supposing they do go into the race, from the larger fish who remain in the Main river, the larger fish do not go into the race at all. I have fished it over and over again myself, and I never caught a salmon or a large trout in the mill-race, nor did anyone else, to my knowledge.

161. And yet you say it takes the whole flow of the river nearly?—Yes, at times when the water is low.

162. I think you said it was half-a-mile long?—Yes; perhaps not quite so much as that.

163. How many turbines have you got?—I have two, two large ones.

164. When the salmon fry go into your race, is there any way for them to come out except 0.30.

Mr. Selas-Kerr—continued.

going back against the stream or going down through the turbines?—There is a bye-wash.

165. Is it a place where the fry can get out, or do get out?—I suppose they do.

166. Do you know?—I have no doubt they do; they either do that or they go straight up and pass down by the river. They have both means of getting to the river freely, and they do undoubtedly get to the river in that way, for they do not go through the turbine wheels.

167. Quite so; they do not go through the turbine wheels?—Not at all.

168. You are quite certain about that?—Quite certain; I am certain there has never been any injured; we could not avoid seeing them if there had been. For 14 years I have been there, and I could not avoid seeing it if the fish had been injured. Neither I or the water-keepers ever saw any there.

169. You mean they never saw the fish actually in the turbines?—I mean to say they never saw a dead fish having the appearance of having been killed in the turbines.

170. But supposing they went into the turbines and were killed, the water would carry them down below; they might pass through and be killed without your seeing them, might they not?—When we had the watch kept which I have spoken of, they could not have passed without being seen. It is an open question in my mind as to whether my turbines kill the fish at all, or whether they go through at all. Nobody ever saw them passing through it, and nobody ever saw them killed.

171. Then you are prepared to state that the turbines do not do as much injury to the fish as perhaps the fishery owners, are you?—Not so much as the fishery owners think.

172. That is your opinion?—It is; I think the fish probably killed by the mills is not more than one for every thousand that are killed by poaching and other things.

173. You do not deny that it is quite possible that fry might be killed in those turbines without your seeing them, do you?—I never heard of an authentic case, but I do not deny that it might be possible under certain conditions.

174. What conditions?—Well, supposing there was a very rapid race carrying the fish irresistibly along beyond the power of the fish to swim against it, that might carry them into anything.

175. Is yours a rapid race?—No, it is not; it is a calm race.

176. Yours is distinctly not a rapid race?—No. At the same time fish have such wonderful power of swimming against the current that it would require a very rapid race to carry them along in such a way as to harm them down there.

177. You are speaking about full-grown salmon, are you not?—Yes.

178. That does not apply to fry?—I am talking either of salmon or fry. At the time the fry are descending the river they are fair-sized fish, you know.

179. Have you got any gratings at all in front of your turbines?—Yes, I have gratings in front of the turbines.

180. What is the distance between the bars?—One inch and three-quarters, I think it is.

181. Why did you put them up?—To keep any

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Mr. Wrenn.

[Continued.]

Mr. Seton-Karr—continued.

any floating sticks, or anything that may come down the river, from getting into the turbine.

182. What effect would sticks, or other floating matter, have on the turbine?—I cannot say from experience, except in one case, when a stick went into the turbine and it was broken in two.

183. The stick was broken?—Yes; it was something like a walking-stick, which could not get through, and it was carried down.

184. It had no effect on the turbine?—No.

185. Any ordinary floating sticks or floating matter would not affect the turbine, you say?—I would not say that, because I have not had experience of it.

186. You do not give it the chance?—No.

187. You keep those gratings there always to keep the floating matter out, do you?—Yes; of course every wheel of every description has a grating; you must have a grating. A dead cow came down once, and if that had got in it would have stopped it, no doubt.

188. How many revolutions does each of your turbines make in the minute, going at the ordinary rate of speed?—About 70, I think.

189. Supposing some fry did go through a turbine going at 70 revolutions a minute, what risk do you think the fry would run?—I do not believe that it would hurt them. My impression is it would not hurt them, but, at the same time, I believe they do not go through it. I have watched exceedingly closely, with the object of trying to ascertain the facts of the case, the grating where they might go past, and I could see right down into the race, but I could see no fish passing in. I believe, simply from my knowledge of hydraulics and mechanics, that if they passed through my turbine it would not injure them in the slightest, but, at the same time, I believe they do not go through. In other words, a fish is a very timid sort of thing, and the very vibration of the wheel and the gratings and the structure is sufficient to keep a fish from going through an artificial structure of that sort if it can avoid it, and if there is no occasion for it to go through it, and I believe they do not go through it at all.

190. I want to get your answer quite clearly about the fish swimming against the water. In your opinion, you think the fry could perfectly easily, having come down the race near to your turbine, swim back again up the river?—Yes, easily.

191. That is your opinion?—Yes.

192. Can you tell the Committee what is the difference between latticing and gratings?—Yes; a grating runs longitudinally with bars, so. That, for instance, is the structure of grating I have at the present time (*Mr. Witness described to the Committee*). It is on a slope, and a latticing is simply a network with small apertures.

193. What material is it made of?—It is made of wire.

Mr. T. W. Russell.

194. It is another name for netting?—Yes.

Mr. Seton-Karr.

195. Is it the same as you referred to as netting just now?—Yes; I think in one place it is called lattice, and in another place it is called netting.

Mr. Seton-Karr—continued.

196. Supposing latticing of proper dimensions to prevent fry going down were erected in front of your turbine, would it, in your opinion, affect the working power of your machinery?—It would close it at once; it has been absolutely tested.

197. Do you know of any mill which has had netting or latticing erected at any time during the last two years?—I do; I know several.

198. Will you mention a case?—Yes; I can mention the case of a mill a little higher up than my place, belonging to Mr. Arthur, a bleacher and manufacturer.

199. What is the name of the mill?—Arthur and Company.

200. Is that on the River Main?—It is on a tributary.

201. Have they had latticing or netting erected?—They were forced to put up this latticing before their turbine wheels last year.

202. What is the result, or what was the result?—The result was that, on letting the water in after they had put them up, in 20 minutes their place was stopped.

203. What has happened since at that mill?—What has happened is this: they have taken them out and they keep them there; they have a watch kept on the inspectors, and as soon as they come round they put them up; they have them fixed in slides, they slip them in, let them see them, and as soon as their backs are turned they pull them out again. Mr. Arthur told me that himself, when I saw them lying there. He said that was the only way he could carry on his business.

204. The inspectors do not know anything about that, I suppose?—I do not know; that is so, at any rate.

205. The result is, the mill is kept going by those means?—That is so.

206. And could not be kept going otherwise, you say?—It could not.

207. Do you know of any other mill that has had to cease working solely on account of lattices or netting?—Yes, I have heard of others that had to stop in the same way.

208. Would you mind mentioning another case, as this is rather an important point?—I think some of the gentlemen will be here before you.

209. I mean from your own knowledge?—From my own knowledge; places I have seen and examined myself, do you mean?

210. Yes?—At Mr. Carr's place at Moorfields they were forced to put them in, and they had to do the same thing, and a number of others.

211. Did they stop working in consequence?—Yes; he said their place stopped.

212. What have they done; have they stopped the mill or practised the same deception, shall I call it, on the inspectors?—He chucked the thing out, and had it out when I called there. I rather think that he told the fishery inspectors that they might do what they liked, and prosecute him as much as they liked.

213. And he refused to keep the netting there?—Yes.

214. And what happened?—I think that was last year, and there has been nothing further done since.

215. And

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Mr. WARD.

[Continued.]

Mr. Seton-Karr, continued.

215. And the mill has gone on working?—Yes; I am not quite certain whether he has put it down when the inspector comes round; at some of the other mills they do; but I rather think he told me in his case that he checked the thing out when he found he could not carry on the work.

216. You are speaking of your own knowledge, are you?—I am speaking of what he told me, standing by the mill, and showing me the nettings and things.

217. The mill is working now, is it?—Yes, but without the netting. I was there on Wednesday last.

218. The mill has never been stopped, has it?—It was stopped when they put it in first, but not since.

219. Do you think that not cleaning the lattices has anything to do with preventing the flow of water?—They cannot clean them; it would take a length of time cleaning them; and in the meantime your place is standing idle, and before it comes to that, especially where it is a matter of textile manufacturing such as my place, the power is slowing off as this lattice is being covered with leaves. The speed is being altered inside the works, and in textile manufacturing you must keep the speed at an absolutely certain stroke. All the looms have to be set working at a certain speed. My looms, for instance, if by any chance they went at five strokes more a minute, would stop working. The shuttles have to be set at a certain strength to what is called a pick, and if they begin to work slower and not get across in time, the looms are stopped.

Mr. T. W. Russell.

220. Your opinion practically amounts to this, that the lattices erected before the turbines would destroy the advantage that arises from the turbines?—Absolutely.

Mr. Seton-Karr.

221. Do you know the Linnahill Bleaching Company's works?—I do.

222. They are large works, are they not?—They are.

223. And they have a very large turbine there, I believe?—They have, I believe.

224. Are you aware that they have a perforated iron plate permanently secured right across in front of their turbine, the perforated holes of which do not exceed half an inch in diameter?—I never saw this perforated thing. I think I understand what it is though. It is a sort of cast-iron thing on a level. It is a very expensive and complicated structure.

225. Have you seen it?—I have seen one similar, and I know their place perfectly well.

226. You are aware they have got that, are you?—I know it. In fact they have one of the old-fashioned turbines there, and they have a great deal of trouble with it owing to the stoppage, I understand.

227. Can you explain how it is, in face of what you have said, that they work this turbine of theirs with this perforated iron plate in front of it without stopping?—It is a totally different thing from the lattice, an absolutely different structure. It is not directly in front of it. At

Q.80.

Mr. Seton-Karr—continued.

least I have seen one similar to that iron plate, and it is a totally different thing altogether, with a much wider opening.

228. Would you object to have such a perforated iron plate in front of your turbine?—Yes; it would not work; it would have the same effect to a lesser extent.

229. Will you explain to the Committee how it is that in the case of those works the working of their turbine is not interfered with by the existence of this plate?—It is interfered with, it checks their speed, and they sometimes have a great deal of trouble with it, their foreman told me; besides it is not a textile manufactory. For instance, supposing their speed slows off it is not the same thing as it is to a manufacturer, therefore it would not affect them in the same way, even assuming it was so, but I know it affects them very much. The reason I say I know what it is is that a great many years ago I had a turbine of that description, and had a great deal of trouble with it myself.

230. You would strongly object to have such a perforated plate, you say?—Yes; I tried it before I put up my turbines here, and we tried to drive looms with it, but we had terrible trouble.

231. How would it affect your turbine?—In the same way. We had constantly to stop, sometimes three or four times, between meal-hours to clear it, and by that time all the looms of the whole factory were stopped, and we had to lower the water and clear this cast-iron plate arrangement, such as there is at Linnahill. That was at a factory in county Armagh which I had.

232. Do you know Fennyng Works?—I do.

233. Is it a fact that they have had gratings and nettings erected there continually?—Yes, I believe they have.

234. Have those works ever been stopped on account of the gratings and nettings erected?—I saw them, and they had not the nettings in at all. I called twice and they had not them in.

235. You cannot say if they have been stopped?—Yes, I can. The man told me they had the greatest difficulty in working them, and he said when he did work he had the netting fixed on a slide, and arranged so as to keep it open at the bottom. It appeared to be in its place, but the water was going in underneath, and that was the only way they could manage.

236. Does that describe the state of things going on there now?—As a matter of fact, now, he has set it in at all, but he said that last year he worked it in that way.

237. He has no netting, do you mean, or no grating?—No. He has gratings, of course, as I have.

238. But the netting is taken away, you say?—Yes. He found it stopped his place again and again, and he then worked it for a length of time by keeping it open underneath the water as if it were down, but the water was passing underneath instead of passing through the netting.

239. And the inspector passed it in that condition, did he?—Yes, the inspector passed it in that condition.

240. What length of time had he the nettings placed in that position in front of his turbine?—I do not know exactly how long.

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241. His

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Mr. WEBB.

[Continued.]

Mr. SEW-KERR—continued.

241. His works were never stopped, were they?—I am sure they were from what he said. It was the only way they were able to carry on their work.

242. Is it the fact that none of the millowners using turbines in that district made any complaints about these gratings until you called a meeting?—Yes; they appealed the case from one court to another.

243. The complaints did not originate at the meeting you called?—No; that was before I called a meeting at all. They were brought up twice to the Court of Queen's Bench, and warrants of distress were issued against them. That was before I had anything to do with it, in fact before I was prosecuted myself.

244. I want to ask you plainly, is there any compromise in the way of gratings or nettings which you as a millowner could suggest, which would possibly satisfy the requirements of the fishery owners?—As I understand it, I would give the fishery authorities the right, if they claim the necessity, of putting up these gratings, but that they should put them up at their own cost, and that we should have some provision, as in the English law, that they shall not be allowed to interfere with the power for working the machinery. That is really a compromise, and it gives us the protection which we, in justice, have a right to look for.

245. I understand your evidence amounts to this, that the gratings and lattices which the fishery owners want is front of your turbines have the effect of stopping your works?—Yes, decidedly.

246. Is there any other grating or netting which would in the way of compromise meet both your views and the views of the fishery owners; a grating which would to some extent keep out the fry, and yet, on the other hand, would not interfere seriously with the running of your works?—The difficulty I have in dealing with it is this, that I do not believe the fish get into the turbines at all.

247. That is a matter of opinion?—What is the use of putting up a thing like that where the fish are to no extent injured, and where the fishery authorities themselves, after looking for six weeks, could not find any injured. I put platforms for them there, and asked them to produce the fish that were injured, but they could not produce any. No one ever saw an injured fish there, and why should anything be put up at all.

248. I am asking you if there is any kind of grating which you could possibly consent to?—The grating we have at the present time, a $1\frac{1}{2}$ or an inch grating, is a very considerable protection, which would prevent any salmon or anything of the sort going into the wheel.

249. But it would not prevent fry going in?—No. If you take a very small fry, of course, it requires the netting to stop it.

250. Then do I understand your position to be this, that if the fry come down the mill-race and get into the turbine they must take their chance, and you object to any netting to keep them out?—I think that is the position.

251. That is your position?—Yes.

Mr. SEW-KERR—continued.

252. And you cannot vary from it?—I believe the fry are not injured to any extent at all, but it is a question of destroying the mill-power, and the prospect of opening out our industries throughout Ireland, and opening out our water-power. If that were insisted on it would absolutely put a stop to everything. That is really the position, and I do not think I could put it in any other way. Then, of course, on the other side, it may be a secondary thing. I believe the injury to fish is nothing, except under the circumstances which I spoke of, where there was a very rapid current driving them into a small turbine, they would be injured. I can conceive in my mind that case, but I know of no case.

253. You really honestly believe that the fry if they go into the turbine are not injured?—I do. I tried to drive some through my turbine for an experiment in connection with this matter, and they would not go into it; they swam away.

254. How did you try to drive them in?—With trout in the front, and we could not get them in. I wanted to experiment to see what the effect was. I believe it would not do them the slightest injury.

255. Of course you are aware it is only for certain months in the year that the danger (assuming it is a danger) to fry would be present. Would you consent to have gratings for a period of the year in front of your turbine?—Nettings, you mean.

256. Yes, nettings?—No; that is really the point.

257. At no time of the year?—No, at no time of the year. Any time of the year would destroy us.

258. Would you object to give the inspectors of Irish fisheries the power, if they thought it necessary, of giving such protection at such periods, and at such places, to the fishery owners as they might from time to time think necessary?—Do you mean leaving the law as it is, but giving the inspector absolute power?

259. Yes?—I do not think that that would be satisfactory, because we would have no statutory protection for our property. Tens of thousands, and in some cases sixties of thousands, of pounds' worth of property would have no statutory protection. Property might be destroyed by the law being put into force, and by the chief inspectors saying, "You must do this." We want statutory protection in Ireland for our property, as you have in England.

260. Do you mean to say you have no confidence in the fishery inspectors?—I do not say that at all. I think they did their best to mitigate any difficulties.

261. I mean with regard to protecting your interests?—No; I look for the protection of the law for my interests.

262. Then you would oppose discretion being given to the inspectors of the Irish fisheries?—I do not think it would meet the point. We would not be in as bad a position as we are in the hands of the conservators, but we look for statutory protection.

263. What

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Mr. WEBB.

[Continued.]

Chairman.

263. What I understand you, Mr. Webb, to say is that you object to all gratings altogether?—No, but to all settings.

Mr. SEAN-KERR.

264. Are bucket wheels or turbines the most likely to be destructive to salmon or salmon fry?—I have had both, and I have both at the present time, and neither of them, in my opinion, hurt them at all.

265. Which is the best for your work, the turbine or the bucket wheel?—Of course the turbine. I have a bucket wheel working at some finishing works, and there the steady drive is not of the same necessity, and therefore I use the old breast wheel that was there originally; it is suitable for that.

266. I suppose the miller, as a rule, has adopted the turbine for his own advantage?—He has adopted it in the textile manufacture, because it is the only drive that is suitable for manufacturing, and which has led to the extension of textile manufacture in different parts of Ireland. They are using it, I know, near Dublin and other places, where they applied to me in connection with its working when erecting turbines.

267. To return for one moment to the fry, you have often seen them outside your turbine wheels, have you not?—Yes; I have seen the fry in all parts of the river.

268. How close have you seen them come to the turbine wheel of their own accord?—I cannot say that I ever saw them close to the turbine wheel, and I cannot say that I ever saw them in the race, but I believe they have been there. I am sure they are there. It is a deep race, you know; I suppose eight or nine feet deep; it is like a canal.

269. Salmon fry are very easily seen when the water is clear, are they not?—Yes. In fishing for trout the salmon fry sometimes take the fly instead.

270. You said just now you had not seen them in your race at all?—No, I never saw them.

271. But you believe they come there?—Yes, I believe they do. I am sure they do. I take it that wherever trout can come they can come.

272. Would you consent or be willing to go back to bucket wheels in order to escape the obligation of putting up the net?—No, I should not; it would be like going back to wagons instead of railways throughout England. That would hardly do.

273. Have you complied with the provisions of the 30th section of 26 & 27 Vict. c. 114, in respect of your turbines?—That is what you are speaking of, the settings.

274. Yes. I want you to answer the question?—No, I have not; I declined to comply with it.

275. You declined to do so?—Yes, I declined to do so. I told them when their penalties amounted to a thousand a year I might think of it.

Mr. T. W. RUSSELL.

276. Have you any knowledge of the English law upon this subject?—Yes; I have this knowledge, that millowners are absolutely protected under the English law from the effective power of their machinery being injured by any gratings &c.

Mr. T. W. RUSSELL—continued.

being put up by the fishery authorities. They have absolute statutory protection.

277. That is to say, if your mills were on an English salmon river instead of upon an Irish one, the law would not compel you to put up these gratings, or these settings?—It would not compel me to put up gratings or settings, or the settings at all. They have no power under the English law to compel the settings. They have power to order the gratings, but they must be put up at the cost of the interest that is benefited, I understand, and they must also maintain the full water supply to the millowner, and that is all we ask.

278. Who are these conservators?—Any magistrate living along a river who takes out a salmon license may be a conservator. It I took out a salmon license I would be a conservator. There are also conservators elected by the license holders of the district.

279. They have property rights in the river, have they?—Yes, they have property rights, and those who hold the fisheries, for instance, the proprietors of the Bann Fisheries and so on along there, who have a pecuniary interest in the salmon fishery, are practically, I understand, the leaders of the matter in regard to the prosecutions.

280. You do not deny their property rights?—No.

281. Your case and the case of the millowners is this, that these rights, perfectly legal rights, are in conflict with the general good?—Yes.

282. And you believe the general good ought to prevail over these rights?—Yes, decidedly.

283. Of course you know what that carries with it in this country?—Yes. My answer to your last question does not convey what I intended. By property rights I thought you meant simply their rights of holding property. I say that my mill does not interfere with any property rights which the fishery proprietors or the conservators have in the fishing.

284. That is another answer altogether. Your case now is that, whilst admitting these property rights, you deny that they are interfered with by your machinery or by the machinery of the millowners?—I do.

285. As regards the grating that you have before your turbine, are you under the necessity of cleaning that out at any time?—Occasionally. For instance, when there is this American weed coming down the river, and also when floating material comes down from the scutch mills, we have sometimes to put a man there constantly keeping it clear.

286. Then do I understand you to say that, whilst it is possible to keep a grating like that clear without injuring the driving of the turbine, it would not be possible to keep a setting clear in the same way?—No; that is the position, but the grating must be close to the works and under constant supervision.

Mr. O'NEILL.

287. You say you object entirely to putting up the setting?—Yes.

288. But not entirely to putting up a grating?—No, not before the wheel. As a matter of fact we have always maintained a grating before the wheel.

289. Is your reason for objecting to the setting that it is more liable to catch the debris?—Yes.

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290. Would

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Mr. WEDD.

[Continued.]

Mr. O'Neill—continued.

290. Would the netting interfere with the power of the water if it were not choked up by debris?—Yes, very considerably. In my case it would reduce the water flow to about one-half.

291. Without any obstruction at all?—Without any obstruction at all. The structure before the turbine wheel which I was called upon to put up would reduce it one-half.

292. Do you not know it is absolutely impossible, if any damage was done to the fry, that it could be done without the knowledge of everybody about there?—I believe it would be absolutely impossible. People living along the banks and seeing the river from morning to night have never seen a fish injured.

293. You say you have never seen any fry in the tail race?—No, I never have.

294. You have seen trout but no salmon fry?—Yes.

295. But you have seen a great many in the river below where the tail race runs into it?—Yes.

296. And did you ever hear or ever observe that any of these fry appeared to have been damaged?—No.

297. If there had been any quantity of them damaged they must have been seen, must they not?—They must have been; as a matter of fact they are not damaged at all.

Mr. Pinkerton.

298. How many scutch mills are there above you?—I have not counted the scutch mills, but there are a vast number.

299. Have you 10?—If you deal with the small tributaries, yes. I have not counted the flax mills myself, but I should say there are probably 30 or 40 flax mills on the tributaries of the river that are driven by the water passing down the Main; I should say 40 at least, but I have not taken them into account in any account I have given.

Chairman.

300. On the River Main, do you mean?—Some are on the River Main, but most of them are on small streams that run into the Main that I have not taken any account of.

Mr. Pinkerton.

301. A question was asked you whether you were prepared to accept any modification of the present netting; now, is it possible, in your opinion, to construct any netting that this refuse from flax mills would not stop up?—I believe it is absolutely impossible.

302. In order to protect your turbine wheel you are compelled, without any outside influence being exercised, to erect a grating to guard your own turbine, are you not?—Yes.

303. And I suppose the safeguard that prevents small bits of sticks and things of that kind going down to the turbine wheel would be an ample protection for keeping out fry?—I believe it would. I believe the fry will not pass between a grating at all. I believe if it was three inches wide they would not pass between it. It is the vibration of the grating that keeps them from it.

304. You gave an answer just now which I did not understand; you said the fry coming

Mr. Pinkerton—continued.

down your middle race were protected?—It was a protection, I believe I said.

305. But how can that be if they are bound to swim back again into the river?—What I meant to convey was this, and I was simply repeating the statement of a more experienced fisherman than I am. He said that out in the open river the large fish prey upon the small fish; even the salmon themselves eat their own young. Then there is the pike and another very large fish which we have there, which I have caught myself with a fly up to 24 lbs. weight. They are out in the open river; they do not go into the race, and, therefore, if the salmon fry did come into the race they would be absolutely protected from the large fish.

306. There is no difficulty in the fry passing up and down?—Not the slightest. They can swim about there as in an open pond.

307. Even supposing they did require to go up your mill race, you stop working at night, do you not?—Yes.

308. And a greater measure of protection would be afforded to the fry under those circumstances?—Yes.

309. With regard to this question of vested interest, I think you are not prepared to admit that any property is injured by this failure to erect settings?—I believe not on our river.

310. You are perfectly willing, if the channels are made wider, that the conservators should have power to make gratings at their own cost, are you not?—Yes, if they do so at their own expense and give us our water supply.

Mr. Cox.

311. You stated, in reply to Mr. O'Neill, that the netting would reduce your water power by half if it were put up?—I stated that the netting before the turbine wheel would; then I stated that at the mouth, where I was required to put up netting, it would reduce the water one-half, so that actually the entire structures they called upon me to erect and prosecuted me about would have only given me a quarter of my original water power.

312. Could that be remedied by widening the course or channel, if the conservators put up the netting themselves?—No, it would not in regard to the netting. The netting is the most impracticable thing and cannot be worked at all.

313. Then, whether they are willing to put up the netting or not, no matter how it is worked, it will materially interfere with your mill, in your opinion?—It would destroy my works.

314. You stated some time ago that Randaletown had improved in wealth and prosperity very much?—Yes.

315. And if these nettings were put up it would materially interfere with the prosperity of the place?—It would close my works, and deprive the people there of employment; it would absolutely close the place. I would not stay there for 12 months. I could not carry on my business there.

316. Of course that is by depriving you of the use of the turbine?—Yes, that is the ground. It is the water power there that induces the manufacturer to start in a country district, and

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Mr. WEBB.

[Continued.]

Mr. Coe—continued.

it is the same throughout all Ireland, where they have a good water power. They may make a centre of industry where they have those advantages, whereas if these advantages are taken away there is no hope of developing the power at all.

317. You have stated that turbines are superior to steam power?—I consider that you get a steadier drive, for I have driven with steam engines and with the turbine wheel, and I consider the latter steadier.

318. I think I heard you state (I am not quite sure whether it is the fact or not) that the Conservators are not under the direction or control of the Fisheries Commissioners; is that so?—I believe that is the Irish law, and I have studied it pretty closely.

319. Do you as a fisherman, apart altogether from a manufacturer, think it desirable that the Conservators should be under the direct control or some control on the part of the Fishery Commissioners?—I think they should be under the control of some one. I think they should be under the control of the law itself, and if the law were right then it would make very little difference.

Mr. Seton-Karr.

320. Do you know the Zion Mills?—I know Messrs. Herdman, of the Zion Mills, very well, and I have seen their mills, but I do not know anything about them; that is to say, I never saw their power.

321. Are they near you?—No, they are not.

322. You know the mills?—Yes.

323. Do you know, as a fact, that they refused to adopt turbine wheels?—No, I do not.

324. You do not know that?—No; I am surprised to hear it, if it is the case.

Mr. McCarthy.

325. What manufacturing process do they carry on there?—Spinning.

326. They are spinners entirely, are they?—Yes.

327. Totally different altogether from the manufacturing process which is carried on by you?—Yes.

Mr. Seton-Karr.

328. They want the same kind of machinery, practically, as you do, do they not; I only ask for information?—I am not a spinner myself, I am a manufacturer and a bleacher, but I do not think it is at all of the same importance.

329. Their requirements are not the same as yours, you think?—I think not.

Mr. Coe.

330. You do a much finer class of work, do you not?—You see they are spinners and we are manufacturers; we make at our place the highest class goods, I suppose, that are made in the United Kingdom, and we would never be able to do it without the turbine wheel.

Mr. Seton-Karr.

331. I want to ask one more question about the fry; you say the fry have not gone down 680.

Mr. Seton-Karr—continued.

your mill-race to your knowledge?—Do you mean through my turbine.

332. Yes?—No.

333. Do you know, or do you not know, whether they have gone down other mill-races?—I do not know.

334. Or through other turbines?—I never knew of any authentic case. I have inquired of the mill-owners up the river, and they have told me they never saw such a thing.

335. Then are you prepared definitely to state generally that fry do not go through turbines, or, if they do go through turbines, they are not injured by them?—No, I do not say so. I think I distinctly stated that, judging simply from my knowledge of hydraulics, I could conceive certain conditions where they might be swept along, and where there was a very high fall, under which they would be injured.

336. May I take it, then, to get it quite plainly, that you confine your observation simply to your own mill-race?—Of course as to anything that I have stated in regard to my own mill-race.

337. And as to your knowledge of other mill-races?—You know that fry are something like a flock of sheep, and that where one goes a larger number will follow; they swim about in large shoals, do they not?—Yes, up to a certain size, and then they scatter. They do not go down the river in shoals; for instance, when they are descending the river, they do not descend in shoals, from my observation.

338. Do you deny that they go down the river in shoals when they are of a certain size?—I think not. I am simply speaking from my own observation, having seen them and having caught them when fishing in the river. I have seen them swimming about, and you can catch them often at the very same time as you fish for trout.

339. Do you not think it likely that if one is swimming down the river, he will be followed by many others like a flock of sheep?—I do not know, but I think not.

340. You do not express any opinion on that?—No further than I have stated.

341. Do you wish this Bill to be passed?—Yes.

342. You say at the present time you do not comply with the law with regard to the erection of lattices or netting?—No.

343. Then will you be in a better position when this Bill is passed?—In regard to a portion of the present Act I have simply got exemption from the present inspectors or from Sir Thomas Brady. I have an exemption for instance with regard to the gratings and nettings demanded at my head race. That is by his grace, and it may be revoked next week by him, or some one may take a different view from what he did, and then my place is stopped and my property confiscated.

344. As matters stand now you will be in no better position if this Bill be passed to-morrow, will you?—Yes, I will. If my property is hanging on a threat that may be cut at any moment, it is only worth half its value. I say if this Bill is passed then I have the original value of my property secured.

345. As matters stand now, I say. Suppose the existing state of things were to continue you would be in no better position if this Bill were passed.

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Mr. WEBB.

[Continued.]

Mr. Selous-Kerr—continued.

Chairman.

passed to-morrow; is not that so?—No, I do not think it is.

345. How is it not so?—As I say this authority can be put in force to-morrow, which means the confiscation of my property.

347. You did not listen to my question; let me put it again. Supposing the existing state of things continued you would be in no better position, would you?—No, I think not.

Mr. T. W. Russell. At all events it would put you, Mr. Webb, into this position, that you would be acting lawfully.

Witness. Yes.

Mr. Selous-Kerr.

348. It would simply give you an assurance that the present state of things would continue; is that what you mean to say?—As far as putting up or taking down any erections is concerned, this law will not relieve me of anything I have at present up, simply because I decline to destroy my place and close it.

Mr. Macartney.

349. Is it not the fact that since the agitation in the county Antrim, and since the pressure that was brought to bear in Parliament, the Inspectors of Fisheries and Conservators have altogether altered their demeanour?—Entirely, so far as the conservators are concerned; they have ceased prosecuting.

350. In your opinion would you have had any chance whatever in getting an exemption had it not been for the course taken in and out of Parliament?—In my opinion it has aided me.

Mr. Selous-Kerr.

351. Is it likely that this exemption will be denied to you shortly or in the near future, supposing this Bill is not passed?—I cannot say; it is a matter of speculation.

352. Have you any reason to suppose it would not be continued to you?—I think that if this Bill is not passed, I will have a very poor time of it.

353. You must have some reason for that; is it because of what Mr. Macartney just asked you?—No; every possible means could be exercised to prosecute me, and destroy my works. Prosecution after prosecution was showered upon me, and I was put to a tremendous expense in defending myself, simply because I took prominent action in organising the mill-owners. The petty sessions clerk himself told me that that was the reason the prosecutions were taken against me in such numbers.

Mr. T. W. Russell.

354. I suppose you object to carry on your business at the discretion of the Fishery Inspectors?—I do.

Mr. JOHN DINAMORE, Junior, called in; and Examined.

Mr. Macartney.

370. I BELIEVE your father is the owner of the Old Green Woollen Mills, Ballymena, county Antrim?—Yes.

371. Do you act as his manager?—Yes.

355. I should like to understand how you obtained the exemption from Sir Thomas Brady; how did it come about; did you apply to Sir Thomas Brady. As the case is now, I understand that you are actually discontinuing what is required by the law under the sanction of the Inspector?—There is nothing in the Act to tell you how to apply for exemption.

356. I did not ask you that; I want to know how you got the exemption; tell us that simply?—I wrote a letter asking him to come and inspect the place.

357. What did you point out to him in the letter?—I think I pointed out that the effect of carrying out the provisions of the law would close my works.

358. Did Sir Thomas Brady visit your works?—He did.

359. Did he give you exemption?—He gave me exemption in regard to the grating and setting at the head race.

360. Did he do it by letter?—Yes.

361. He wrote you a letter exempting you from certain conditions?—Yes; but he has no power under the Irish law to give exemption in regard to the turbine wheels.

362. I did not ask you that, because you really cannot know what power he has. Sir Thomas Brady can tell us that best himself?—He told me so himself.

363. Did he give you exemption?—He did.

364. You have acted upon that, have you?—Yes.

365. And you are not now molested?—Yes.

Mr. Macartney.

366. Was that before or after the prosecutions?—After; as a matter of fact, the Conservators pressed for a penalty against me even after I had the exemption.

367. Are you aware that very considerable pressure was put on Sir Thomas Brady and the Inspector of Fisheries to go down personally and inquire into this case?—I am.

368. Do you think without that pressure he would have gone?—I do not know; that is a speculative question. I have not anything to say against Sir Thomas Brady.

Chairman.

369. The answer I obtained from you was that you wrote a letter to Sir Thomas Brady, who inspected and gave you a letter of exemption, and that you are acting upon it?—After the prosecutions, and after I had months before brought under the notice of the chief officer of the Conservators that it would destroy my place and close my works.

Mr. Macartney—continued.

372. Previous to your acting as manager, you were for two years at the Yorkshire College of Technical Education at Leeds. I believe?—Yes.

373. Is your mill on the River Main or on a tributary?

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[Continued.]

Mr. Macartary—continued.

tributary?—It is on a tributary of the Main, about three miles above its mouth; where it joins the Main it is called the Kells Water.

374. How many hands do you employ?—About 110.

375. How many turbines have you?—We have two turbines.

376. What is your horse-power?—About 45 horse-power each, about 90 horse-power altogether we get out of them.

377. Were you called upon to put up any gratings, lattices, or wire nettings?—We were required to put up a grating at the intake to our race, which is about half-a-mile from the works, and maintain it there, and also to put up a lattice with the regulation meshes of three-eighths of an inch apart, where the flumes of the turbines leave the dams at the back.

378. I believe you were prosecuted in the month of October 1889?—We were, for not having these up.

Mr. Sater-Karr.

379. By whom?—As far as we know by Mr. Edward Meale.

380. Did you put up any of these lattices?—We put up the grating at the head-race, and also the lattice, and they were a source of perpetual trouble and annoyance to us. We had to take the grating out first, at the intake; it could not be kept clear. The *détoris* gathered on it, and during the frost it was frozen up to such an extent that on one occasion the place was stopped about five o'clock in the evening.

Mr. T. W. Russell.

381. Was this at the head-race?—Yes, the grating at the head-race, just behind the sluices, which are fully half-a-mile from the place. The place was stopped, and we could not make out what was wrong about the water, and a man was sent up to see the cause. We use the electric light, and any diminution in water-power and any variation in speed means that the light goes out. We have no other source of light during the night but the electric light.

Mr. Macartary.

382. You work night and day?—Yes, night and day; the speed decreased, the light went out, and a man was sent to see the cause of it. On a dark night it takes a man 20 minutes to go up to where the grating was.

383. In regard to clearing a grating minute like that, would it not be a matter of difficulty at night?—It would require us to keep a man there always.

384. But at night it would be difficult to get it clear, would it not?—Yes, it would. There is no other road than a narrow dangerous pathway, with the river on one side and the mill-race on the other.

385. Apart from the effect it had on your electric light, it would have, in your opinion, an injurious effect on the driving power which you use for your manufacturing purposes, would it not?—Unquestionably. We have the same difficulties as Webb has to contend with. We do weaving; in fact we do the whole of our manufacturing, and, of course, with fast looms and improved machinery, which are a necessity

Q.A.O.

Mr. Macartary—continued.

now-a-days. I may tell you now that a few years ago the looms used in the woollen trade were the old looms made in this country. The looms used now-a-days are an American invention, going at twice the speed. We must have a very steady drive, or the shuttles will avoid the looms altogether, fly out, and smash the loom, or perhaps, knock an eye out. We have not had such an accident, but they frequently do occur. We require a very regular speed.

386. I believe you formerly had an old wheel?—We had three water wheels formerly, three ordinary breast-wheels. We took them out and put in the two turbines.

387. Would it be possible to carry on your business with the old-fashioned wheels satisfactorily?—Not by using water-power. We could not utilize the water power with the old water-wheels; I mean the old ordinary breast-wheels. They are almost incapable of being governed, and you cannot get a regular speed with them. In the first place they are of such a great mass that they do not respond so quickly to any system of governing, and the difficulty of getting a mechanical contrivance with any degree of accuracy is almost insurmountable. I have never seen anything by which they could be properly governed.

388. With regard to the hands employed, do you know of any instance of their objecting to work with the old wheels?—A neighbour of ours has an old wheel, and I know any skilled artisans whom he brings over to this country do not care to stay with him. A man takes a pride in his work, and, where it is impossible to keep the looms going he cannot produce such good work. We have a man who was with him, and he left because, he said, he could not work there with the old wheels.

389. In fact, in order to turn out the goods to the best advantage, a turbine is a necessity, is it?—Yes, it is, if water is the motive power.

390. You have heard Mr. Webb's evidence on the importance of the turbine to the manufacturing interests in your neighbourhood, and you increase it fully, I suppose?—Emphatically; I do not take the slightest exception to it. It is only with turbines I consider that we can work, and utilize the water-power effectually.

391. With regard to the question of injury to fish, I suppose you are constantly going up and down your race; I mean to say you constantly have the water going into your turbine in view, have you not?—Yes.

392. Have you ever seen any dead fish in your tail race?—Never. I never saw a dead fish. I have watched the race many a time during the day and I never saw a dead fish there.

393. Do you believe they go through the turbine or not? I am not putting it absolutely, but do you think they do go through?—I cannot say that they go through.

394. Do you believe that salmon fry would be injured if they did go through?—I believe they would not be injured.

395. Will you state to the Committee your reasons?—In the first place, the apertures in the turbine wheels, which are 36-inch wheels with two rows of buckets, 12 buckets on each row, are an inch and three-quarters by three inches wide. The water passing through those wheels must

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necessarily

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[Continued.]

Mr. Muessey—continued.

necessarily be going at a greater speed than the wheels themselves, or any portion of the wheels; it must have considerable speed leaving those wheels, and I contend that the small fry are carried along with the swirl of the water right through the wheels. I do not see where they can be injured by them.

396. Have you ever had an opportunity of observing the water coming into your wheel, and salmon try near it?—I have seen them in the head race.

397. Have you seen them quite close to the grating in front of the turbine wheel?—I have seen them about it; within a short distance of it.

398. Have you ever observed them going through the grating?—No, I never observed them going through the grating.

399. Is yours a quick current; quicker than Mr. Webb's, for instance?—I have not seen Mr. Webb's; but I should imagine it is.

400. Would you call yours a quick current?—Yes, it is, in the race.

401. When you noticed the fish, did they seem to be able to keep away from the grating?—There is no particular rush of the current at the grating.

402. I will put to you, generally, one or two questions. In your opinion, if the law remains as it is, and power remains either in the hands of the conservators, or in the hands of the fishery inspectors, to insist, at their discretion, upon lattices and wire nettings and gratings, would it be impossible for you to carry on your business; I mean, supposing you were obliged to keep up these lattices and wire nettings, could you carry on your business with the same advantage as you do at the present moment?—Most decidedly not. It will be a very serious thing to have to do this. On one occasion the grating on the top of the race was stopped up with frost and leaves three times between five o'clock and eight o'clock in the evening. We pulled it out, and after it was pulled out Sir Thomas Brady came round, and, recognising the impossibility of keeping it in, he granted us an exemption, and it has never been in since.

403. Was that after a prosecution?—That was after a prosecution.

404. Do you remember exactly when that was; was it last year?—I think it was last winter; the beginning of the winter of 1890. I cannot be quite sure when it was, but I remember clearly the fact.

405. Do you, as the representative of your mill, object to the law being left as it is at the present moment, which places you as a mill-owner and manufacturer at the discretion of the Board of Conservators?—I do. I object to have to put these gratings up. The lattices also have been a source of trouble to us.

Mr. Hayden.

406. Is it your opinion that, with the rapid race to your mill, the present system is not injurious to the fish?—I believe it is not injurious to the fish.

407. Perhaps you do not view it from a fishing point of view?—Well, I have never seen a fish injured in the river.

Mr. Hayden—continued.

408. Mr. Webb stated that the conservators were confined to magistrates; is that the case?—I do not know about that.

Chairman.—I understood Mr. Webb to say that the conservators included anyone who took out a license to fish. I think that, perhaps, in the course of the inquiry we shall learn more clearly who the conservators are and what their powers are.

Mr. Tomlinson.

409. What is the amount of the fall in your race?—We have about 25 feet available fall.

410. What rate is that; one or how many?—It is about half-a-mile long.

411. Did you construct the mill race?—No; it has been in existence for 100 years.

412. It is an old mill race; is it?—Yes, it is an old mill race; it belonged to my great grandfather.

413. Is there any ladder or means of enabling the fish to go up the dam?—None whatever. I never heard of such a thing until this agitation began.

414. Have you ever noticed the river below the dam?—Yes.

415. Have you ever seen any fish there?—I have seen plenty of fish there on many occasions.

416. Have you any practical acquaintance with the habits of salmon?—Nothing more than seeing them lifted off the face of the weir by poachers.

417. You are not acquainted with any salmon rivers in this country?—No, I am not.

418. Is there much poaching in the river, in your experience?—There was a great deal more poaching previously, I think, than there is now, but there has been always and there are a great number of poachers about the river.

419. Is your river much blocked up by the American weed?—Not our length. It is where our river joins the Main, but the little tributary on which our mill is built is a rapid stream with a stinging bottom, and I take it this weed would only exist in slow running rivers.

420. Do the salmon breed in your tributary?—They do.

421. How do they come up?—They have to jump these weirs and take their chance of getting up. I have seen fish on many occasions jumping at the weirs several times, and being rushed back again. There are no facilities for the fish getting up.

422. In your judgment would a salmon ladder be of advantage?—I could not say. I do not know what they are, I have only heard of them. I certainly think something is needed to allow fish a better chance of getting over the weir.

Mr. Seton-Karr.

423. How much of the flow of the tributary do you take in your mill race in ordinary months?—During the summer months we take it nearly all.

424. Do you think it would be possible for all the fry to get back if they got up your race?—I think so. Two or three times a day the sluice is pulled out and the whole of the water of the race runs down the overflow.

425. And

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[Continued.]

Mr. Seton-Karr—continued.

425. And then the fry in the race could get through without injury by the turbine?—Without going by the turbine at all.

426. How often do you do that?—Twice a day; then, of course, there is more opportunity for the water to get away, during that time the dam is drained almost dry.

427. Twice a day when you are working?—No, we are not working; it is during meal hours that that occurs.

428. Do you say that no fry, to your knowledge, have been injured in your turbine?—I never saw one.

429. Is it not a fact that, supposing they were injured in the turbine, they would not stay there, but would be carried by the rush of water down the river?—It would take them a long time. Our race has been cut so low that there is little fall from the turbine for a considerable distance, and the water runs very slowly.

430. Then you tell the Committee that if fry were injured or killed in your turbine, in your opinion you would be able to see them below?—Yes, I would.

431. You would be able to see the dead bodies?—Yes.

432. You think it would not be possible for fish to be injured in your turbine to any great extent without your seeing them?—Of course I am not there all the time, but I am there very frequently, and for the last five years I have never seen a dead fish. It is hardly possible that, if the fish are killed in the myriads it is contended they are, I should not have been able to see them.

433. You deny that, do you?—I do.

434. And you say it is your opinion that the fish are not injured by your turbine?—Yes, it is.

435. Would you, or would you not, consent to say different kind of grating being placed in front of your turbine than at present exists?—It might be worse for us, perhaps.

436. You would not consent to have a lattice placed in front of your turbine?—We are required to have a lattice at present in front of our turbine.

437. Not one small enough to keep fry out, I suppose?—The meshes are three-eighths of an inch apart.

438. You have no objection to that?—Yes, we have an objection to that.

439. Do I understand you to say that there exists a lattice or netting in front of your turbine now that you desire to have removed?—Yes, it was there.

440. Why?—Because it obstructed the flow of water into the turbine.

441. Your mill is working now, is it not?—Yes, but the lattice is lying on the bank.

442. In other words, then, the lattice is not there?—The lattice is not there.

443. I only want to have the exact situation. As a matter of fact, there is no grating there at the present moment that interferes with the working of your mill, is there?—That lattice was pulled out on the second Thursday in this month. It was put in on the 8th of March, so far as I can remember. I believe it should have been put in on the 1st, but we had frost more or less during that time. It was put in on the 8th, 1890.

Mr. Seton-Karr—continued.

and on the 9th or 10th we had a severe snow-storm, accompanied by keen frost. The snow gathered with the frost and came floating forward to the turbine, and that, along with the old beech leaves and straw, and other things brought down by the current, simply clogged up this lattice so effectually, that on Thursday morning we were absolutely stopped. There was not enough water running through to drive one machine.

444. How long was your mill stopped for?—It was stopped till we got the lattice pulled out.

445. How long was that?—In the first place, there was my amount of water in the dam and we could not make out what was wrong. We thought there was something wrong with the turbine because we had been overhauling it, but then, when we found it out, it was stopped for half-an-hour altogether.

446. It was not stopped more than half-an-hour?—No.

447. Has your mill been stopped on any other occasion recently by the existence of this or any other lattice?—You see we got an exemption for the grating. It has never been in for nearly two years now, so that the only cause would be the lattice, and the lattice only went in on the 8th and came out on the 16th March of this year.

Chairman.

448. I do not quite understand you. You say, first of all, you have a lattice in front of the turbine, and then you say it was moved, and now you say you are exempt?—For the grating at the intake.

Mr. Seton-Karr.

449. In other words, that half-an-hour you speak of is the only time your mill has been stopped at all, owing to the existence of any lattice or grating?—As a matter of fact, for this year, yes. Of course, it only went in on the 8th, eight days later than it ought to have gone in, and was out again on the 16th.

450. Then you took it out?—Yes.

451. And now you have no exemption?—No; we have no exemption for that.

452. What is your exact position now legally with regard to this grating?—We are contravening the law as it stands at present as regards the lattice, not the grating.

453. It is lying on the bank at present, is it?—It is lying on the bank at present.

Mr. Macartney.

454. You have an exemption for the grating at the head race?—Yes, at the head race.

455. But you are contravening the law with regard to the lattices in front of the turbine?—Yes.

Mr. Seton-Karr.

456. Supposing the law is not altered now, is it likely that you will be compelled to put that grating in, or will matters remain as they are?—I think it is very possible we will be compelled to put them in again. I imagine we should be.

457. Have you any particular reason that you can give the Committee for saying that?—The conservators,

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[Continued.]

Mr. Scoten-Karr—continued.

conservators have been a great deal more gentle in their treatment of us since the agitation began, and one would not expect the same treatment if we had failed in our object.

458. Then does not that seem to be a reason for expecting that you would not be asked to put the lattice in?—No; I think we might reasonably expect that would occur.

459. But you said just now you thought it very possible you would be obliged to put it in if things remained as they are: I must ask you what reason you have for making that statement?—I do not think I made that statement.

460. Perhaps I misunderstood you. Then you do not think you would be obliged to put your lattice in in front of the turbine, as things now exist?—I think we would if they knew. I imagine they would oblig us to if they knew it was out. I have no reason to believe otherwise. In fact the law has been allowed to lapse to a great extent, or at least it has not been carried out to the letter during the time this agitation has been pending.

461. But during the recent agitation you have been treated more leniently?—We have.

462. That is a reason for supposing you would not be interlarded with?—No; I take it the agitation was the cause of the lenient treatment. Take away the cause, and I say things will go back again to their old state.

463. After the water passes your turbine, what mills does it pass on to?—Our bye-wash runs into the mill race of another factory; Mr. Arthur's, of Greenfield.

464. Greenfield Mills?—Yes.

465. After that, where does the water go on to: do you know?—It goes on to another woollen mill belonging to a man of the same name as mine.

466. Is it the Temple Moyle Woollen Mill?—Yes.

467. Have they turbines at both those mills?—Yes.

468. What risk do you think fry would run going through all those three sets of turbines, yours and the other two you have mentioned?—I cannot say, but from my own observation I should say they run no risk, because I have seen no fish killed from our own turbines, and I have seen none killed in any other person's turbines.

469. Are you a fisherman?—No, not very much.

470. Then you do not pretend to know very much about the habits of salmon fry, do you?—Well, one cannot live near a river without picking up a little information now and again about it.

471. But you have no special knowledge?—No.

472. Do you know the Moorfields Dyeing and Finishing Mills?—Yes.

473. Do you know Messrs. Arthur's?—I do.

474. And do you know Mr. Francis Dismore's?—Yes.

475. Those are the mills you alluded to just now?—Yes.

476. Do you know Mr. John Ross's mills?—I do not know much about the place.

477. Have you seen them?—Yes.

Mr. Scoten-Karr—continued.

478. Have they all turbines in use?—I do not know about Mr. Ross's.

479. You do not know?—No, I do not. I do not know about Mr. Ross's, and about the Moorfield I am not at all sure.

480. Do you know if they have lattices and nettings erected in front of their mills and mill races?—I do not.

481. Did you ever hear of any of these works being obliged to stop on account of the lattices or nettings being placed in front of their turbines, or in their mill races?—I believe I have heard of Greenfield, nearest us. The others are some distance off.

482. You have heard of Greenfield stopping?—I believe I have.

483. When, and for how long?—I do not think it would be for long.

484. Can you give the Committee some idea; was it a day or two?—No. Of course they have to keep men looking after the place.

485. Was it an hour or two?—Yes, an hour or two.

486. No serious stoppage has occurred?—No; but the means they took for obviating that was by removing the gratings in every case, so far as I understand.

487. You say there is great difficulty in cleaning those lattices, as I understand?—They cannot be cleaned, especially during frost. The lattices we had during the frost time was simply welded into the framework, and it had to be smashed out.

488. And you shortened the cleaning by taking the lattice out, did you?—It had to be smashed out and the place stopped. The water had run away from the back of the lattice, and the whole pressure was on the face; there was no compensating pressure on the back, and it was simply closed up.

489. Supposing you had a perforated iron grating or sheet, would not that be much more easily cleaned?—I do not think so; the holes would get jammed.

490. The surface would be smooth, would it not?—Yes; but it would be bound to be of some appreciable thickness.

491. But that would not affect the cleaning, would it?—You could scrape the face clean, but it does not follow you would have the holes quite clean.

492. You would be able to scrape the face much more easily, would you not?—Undoubtedly; that is, supposing you had a smooth surface on the face and small perforations through it. But during frost, for instance, and taking the case of the early spring months, the flow coming down covers in these holes and it freezes, and no scraping would remove that.

493. Then you say, most distinctly, these lattices or perforated plates, you do not care which, seriously interfere with the working of your mills?—Decidedly.

494. You maintain that opinion?—Yes, I do.

495. How do you account for the fact that a perforated iron plate is kept continually up at the Liffordmill turbine, and that it does not affect their water flow?—Liffordmill, if I am rightly informed, have a much smaller fall than we have, consequently there is a less rush of water; there

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[Continued.]

Mr. Sison-Karr—continued.

there is more time for sediment to settle, and less tendency towards being jammed in these perforations.

495. You admit, in that case, that the perforated iron plate does not affect the working of that mill, do you?—I do not know anything about it, only I believe they have a smaller fall.

497. Are you very anxious for this Bill to pass?—I am.

498. Do you think it would improve your position?—I do.

499. Do you think it is a satisfactory and a workable Bill?—I do not think my opinion would be of much consequence in that respect. I think if we had the Bill put on the same footing as the English law is it would be better.

500. It would affect your interest very much?—Yes.

501. I suppose you have read the Bill carefully?—I have.

502. Are there any points on which you would be willing to admit of any amendment. Have you read the Bill sufficiently carefully to form an opinion on that?—No; I have not. I would not volunteer any suggestion in that respect.

503. At the same time you have told the Committee that your mill is running satisfactorily, and you are not being interfered with?—We are not; but we are contravening the law as it exists.

504. I understand that; but as a matter of fact you are not being interfered with?—We are not being interfered with, but still they have the power to interfere with us if they wish.

505. In your opinion is there any compromise with regard to the erection of these gratings which would satisfy you and which would satisfy the fishery owners?—We will give them every facility for putting up their own gratings and keeping them cleared.

506. Putting up their own gratings?—Yes.

507. What kind of gratings?—Whatever kind they think necessary for the protection of the fish.

508. But you said that certain gratings stopped the flow in your mill race and you were obliged to take them out?—They have more ingenuity and more time at their disposal than we have, and if they can devise a method for doing it we will give them facilities.

509. So long as your flow is not retarded you do not care what they put up?—No.

510. And you will give them reasonable facilities for putting them up?—Yes; we will give them reasonable facilities for putting them up.

511. But you must have your flow of water you say?—You see we have built up our business on the supposition that we will have a certain flow of water as long as we are there.

512. Admitting for the sake of argument that the turbines do kill the salmon fry, your position is, I take it, that the salmon fry must take their chance in your turbine, assuming that no grating can be put up which does not interfere with the flow of your water?—It is not our interest directly. No person, and I am sure the mill-owners less than anybody, has any wish to see
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Mr. Sison-Karr—continued.

the fishing destroyed, but the protection of the fish is not our interest. Those whose interest is in it I think ought to do it.

513. You know the river; you have lived on it a long time; can you suggest any kind of grating which would meet both your views and the views of the fishery owners?—No, I cannot.

514. You object to perforated plates, do you?—If they can use them effectually let them, but I do not see how perforated plates would be a vast advantage to us.

515. I think you have said you cannot keep them clean, or at any rate those you have seen already cannot be kept clean?—I have never seen perforated plates; the lattices we cannot keep clean.

516. You have never seen perforated plates?—I have never seen perforated plates.

517. And you do not think they can be kept clean?—I do not think in our case they would be much better than the lattices, because naturally there would have to be larger spaces between the perforations, and I believe where there was a frost they would close up worse even than the lattices.

518. But should such a grating be found that could be kept clean and would not interfere with your flow of water, you say you would give every facility to the fishery owner to erect them?—Yes, and look after them too.

519. Would you consent to the Fishery Inspectors having full discretion to decide whether such gratings should or should not be erected in any mill race?—With an appeal to some judicial authority.

520. With the right of appeal?—Yes.

521. You would consent to that?—I think we should not consider ourselves badly treated, but to allow them to decide without the right of appeal I think is not right.

522. Practically your business has not been interfered with hitherto by any gratings that have been erected, has it?—You see we have not the gratings there; the exemption was granted.

523. As a matter of fact your business has not been interfered with hitherto?—No, it has not, because that grating has been taken out. I imagine that Mr. Thomas Bray recognised the fact that it could not be used, and granted the exemption.

Mr. O'Neill.

524. You heard Mr. Webb say that in his opinion salmon were not nearly so numerous now as they were about 20 years ago?—Yes.

525. Is that your opinion too?—Yes.

526. It is alleged by some people that one of the reasons is the destruction of the fry by the turbine wheels. You have already said that is not your opinion, and that you think the turbine wheels do not do them any harm?—I think not.

527. Living on the river as you do, perhaps you are aware of some other causes for this diminution in the number of fish; for instance, the lifting at the weir?—Yes, I know there are a lot of people who almost live by poaching. The living is getting less than it was, but until a few years ago they practically lived by it.

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528. How

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[Continued.]

Mr. O'Neill—continued.

528. How do they poach?—I have known of the rivers being pulled for weeks running by drag-nets, and another source of gain to these poachers is the lifting of the fish as they run up the weirs by gills, hooks with a little catch on the point of them, so that the fish cannot get off when they get on them.

529. And they do that late in the season, when they are running up to spawn, do they not?—Yes, at those times, at nearly every weir bank, there are fellows who have nothing else to do catching them.

530. You know there has been a great destruction of fish by netting and gaffing, do you not?—Yes; I have seen the fish pulled out on numerous occasions.

531. Of all sizes?—Yes.

532. Do you know of any other way of destroying fish; lime, for instance?—Yes; I have known of lime being used about the holes. The river between floods is very dry. The better drainage in the upper reaches of the river makes the water run off quicker, and in these holes lime is sometimes put in, and sometimes vitriol, and the fish sicken, and rise to the top, and are lifted. Flax water, of course, is also allowed to escape. You can smell it.

533. And that is very bad for fish, too, is it not?—Yes; it must be.

534. Have you ever known of any dynamite being used?—Yes; I have heard of dynamite being used. It is looked upon as having a peculiar effect on the fish. It is not the shock that kills, but I believe there is a poisonous action with it.

535. Has it been used in the Kells water?—It has been used in the Kells water.

536. So that part are destroyed by nets, gaffs, lime, dynamite, and vitriol?—Yes; and then

Mr. O'Neill—continued.

there is another source of destruction; that is the growth of the pike.

537. Are they more numerous now?—They are a great deal more numerous than they were before. In fact, they are so numerous that the conservators, I understand, have instructed the water bailiffs at a certain season of the year, about Easter time, to poison some reaches of the river to kill the pike.

538. Do they not kill some other fish, too?—They do; but I suppose they want to kill the pike.

539. Do the water bailiff, who are so active about the gratings, summons men for poaching and destroying fish?—Never hardly hear of a conviction for destruction of fish.

540. Has not Mr. Moulé brought forward any cases?—I have seen Mr. Moulé about our place several times since the prosecutions commenced about the gratings; but I think I have only seen a water bailiff about our place once or twice in my lifetime before. I have been at the back of our place hundreds of times during the winter, and the water bailiff is no individual I never saw near the place.

Mr. Plunkerton.

541. You have no objection to the lattice remaining in its present position; that is, lying on the bank?—Not the slightest.

542. The question was asked you, "Do you desire the passing of this Bill?" Do you prefer being left to the tender mercy of your friend Mr. Moulé, without the protection of the law?—Decidedly not. We look on the law as made to protect us, and we wish it to protect us.

543. And you are virtually carrying on your trade at the present moment at the mercy of a water bailiff, are you not?—Yes, I suppose you can best put it so.

Friday, 25th March 1892.

MEMBERS PRESENT :

Mr. Cox.
Sir John Whittaker Ellis.
Mr. Hayden.
Mr. Macartney.
Mr. O'Neill.

Mr. Pinkerton.
Mr. T. W. Russell.
Mr. Seton-Karr.
Mr. Tomlinson.

SIR JOHN WHITTAKER ELLIS, BART., IN THE CHAIR.

Mr. LACHLAN ARTHUR, called in ; and Examined.

Mr. Macartney.

Mr. Macartney—continued.

544. You are a partner in the firm of Arthur & Company of the Greenfield Bleaching and Dyeing Works, are you not?—Yes.

545. Do you do an extensive business in bleaching and dyeing linsens and cottons?—Yes.

546. What is the value of the goods passing through your hands every month?—The value is from about 9,000 £ to 10,000 £ per month.

547. How many hands do you employ?—From 80 to 100.

548. And your wages average in the year about how much?—About 2,500 £ a year.

549. Your annual carriage account averages about how much?—£ 1,500 a year.

550. Where does the great bulk of your goods come from?—From Manchester.

551. Are you in competition with the Lancashire finishers?—Yes.

552. In this competition your water power is of great value to you, is it not?—Yes, we could not compete at all except with a large supply of water power.

553. Your works are on the Kellewater river, are they not?—Yes, on the Kellewater river.

554. Are there any other similar works to yours on that river?—There are 14 other places on the same river.

555. What is the average horse-power developed with these works?—A 100 horse-power to each work.

556. What would you estimate the total wages paid at from these works?—I should say from 30,000 £ to 32,000 £ a year.

557. Can you give any estimate to the Committee of what each horse-power is worth?—According to the English valuation each horse-power is worth 3 £.

558. Not only your works, but all these works are dependent on the efficient power they derive from the water, are they not?—Yes, altogether from the water.

559. You were prosecuted, I believe?—Yes, we were.

560. What were you called upon to erect?—0.80.

We were called upon to erect these lattices in front of the turbine wheel.

561. I believe you produce here one of the lattices?—Yes, we do.

562. Will you show it to the Committee (*the same was produced*). Was that lattice placed before your turbine wheel?—That is one of three which were placed there.

563. Is that now in precisely the same condition as when it was taken out?—Just the same condition.

564. What was the effect of erecting those lattices upon your works?—Whenever we placed them in front of the turbine wheel, inside of 30 minutes, we found the power dropping away, and in two hours the works came to a complete standstill.

565. Your works were brought to a standstill within two hours, were they?—Yes.

566. What did you do then?—We took them out.

567. And have you kept them out ever since?—Almost ever since.

568. Will you explain to the Committee what you do?—When we look for a visit from the inspector of fisheries we might drop them in for half-an-hour.

569. You put them down, and then take them out again?—Yes; we had no other choice.

570. With regard to the injury to the fish, have you ever seen any injured fish there?—Never.

571. Either in your tail-race, bye-wash, head-race, or anywhere?—Never.

572. Do you believe that fish in the shape of salmon trout go through the turbine?—I cannot say about that; I am not clear upon that point; but we have got a water hauliff living in our neighbourhood, and we have invited him to come time after time to inspect the race when the works were stopped to see if he could find any injured fish.

573. And he never has?—And he never has. He is quite prepared to prove that on oath.

574. It has been stated to the Committee by witnesses who have appeared before them that the

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Mr. ARTHUR.

[Continued.]

Mr. Macarty—continued.

the use of these turbines is of the very highest importance to the trade of the district?—Yes.

575. Do you agree in that evidence?—I quite agree in it.

576. And that if the law remains as it is, and power were given to the fishery inspectors or to the Board of Conservators to insist on the erection of lattices and wire settings of this description, your power, as derived from the water, would be practically destroyed?—Yes, that is so. Our business would be ruined.

577. I believe your business is a business which has been developed entirely by the fact that you can obtain water power?—That is so.

578. With regard to other causes which might diminish the amount of salmon in the river, can you speak to any of them?—There are several reasons given. I should have thought a large quantity of flax water running into the river might have some tendency to diminish them; and it is supposed that now in the Kells Water there are a great many jacks.

579. In your knowledge have the pike increased in recent years?—The water bailiffs are of opinion that they have increased largely.

Mr. TULLOCH.

580. What is the nature of the fibre that collects round the wires on those nets?—There are a great many leaves.

581. Yes; but I see a sort of thread-substance round them; what is that?—It is nothing but straw.

582. Is it refuse from the flax, do you think? I allude to the stuff which is closely wrapped round the wires?—That is the wire itself.

583. Is poaching extensively practised, do you know?—I am told it is.

584. Do you yourself fish?—No, I do not fish myself.

Mr. PICKERTON.

585. Have you examined this Bill?—I have not.

Mr. ALEXANDER BASIL WILSON, is called in; and Examined.

Mr. MACARTY.

586. You are a mechanical and consulting engineer, I believe?—Yes.

586. You have been engaged, I believe, since the year 1877, at various times, in constructing water wheels, and other machinery driven by water power, in the north, and other parts of Ireland?—Yes; especially on the rivers Main and Kellawater.

587. Are you thoroughly acquainted with the mills on the Main and its tributaries?—Yes.

588. Have you inspected these turbine wheels?—I put up the turbine wheel that the last witness has been referring to, and several others also.

589. You are aware of the manufacturing processes that are carried on in the mills, are you not?—Yes.

590. In your opinion, for their successful operation, is a constant supply of water necessary for driving and washing purposes?—It must not

Mr. PICKERTON—continued.

589. You have not read it?—No.

587. Then you are not able to give any opinion with regard to whether it meets the requirements of your case or not?—My opinion is simply this; if we are forced to put up these lattices our business will be ruined.

588. Do you believe that it is possible any compromise could be arrived at between the owners of fisheries and the millowners?—I am sure the millowners are quite willing to do anything providing there is no interference with the water right; but an interference with the water rights we could not have.

589. Do you think it is possible that any grating could be erected without interfering with your water power?—I am not aware of any such grating.

590. And you are fully of opinion that the turbine wheel is not injurious to the fish, are you?—We have tried for the last two years to see if we could find any evidence of fish being injured by a turbine wheel, and we cannot find any.

591. What cost would the erection and the maintenance in proper working order of these gratings and lattices entail?—I suppose the cost might come to 250 £. or 300 £.

592. If your water power was not interfered with you have no objection, I suppose, to the owners of the fisheries erecting these affairs at their own cost?—Not the slightest, as long as our water powers are not interfered with.

Mr. COX.

593. The only question I have to ask you is this: if they persist in compelling you to keep up these screens, what would be the effect?—Our works would come to a complete standstill.

594. And you would have to disperse your workmen, would you not?—We should have to disperse our workmen, and dismiss our hands altogether.

Mr. MACARTY—continued.

only be constant, but, as far as possible, uniform. For many of the manufactures that are carried on there the speed of the machinery must be kept at a uniform rate. There are two principal industries in the district, weaving, and the bleaching and finishing of textile fabrics. In the former case the business cannot be carried on without uniformity of speed.

Chairman.

591. That is the weaving?—Yes, the weaving. Without going into technicalities, a change of speed involves a stoppage of all the looms and damage to the cloth in process of manufacture. In the case of bleaching and finishing absolute regularity of speed is not so important within reasonable limits; that is to say, 5 per cent. above or below is not of vast importance; in the case of finishing, the machinery runs night and day. During the night it is difficult in

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Mr. WILSON.

[Continued.]

Chairman—continued.

In exposed situations to preserve the weirs free. In many cases, such, for instance, as the works of the Lisnasillan Bleaching Company and the Old Green Woollen Mills. Mr. Dimmore's place, the distance from the weirs, the intake of the stream, is from a third of a mile to a mile. In one case it is a third of a mile, and in the other case it is about a mile. In winter it is practically impossible to have men constantly present to keep the opening clear. On the mill sites of this stream, the Main and its tributaries, each mill site is so close to the one above and below it that there is no margin of fall, and the least stoppage, for instance, an alteration of 6 inches in the level of the water of a lower mill, blocks the fall of the higher one. In this river every advantage is taken of the water power as far as possible. The mills are as closely in succession as they can be placed. If any obstruction is placed in the way the water passes over the weir down the stream, and not into the lead at all; a difference of 4 inches in some cases, which is a comparatively small difference, will throw all the water over the weirs.

602. So that you mean, whether it is stopped at the top mill or the lower mill the effect is the same. The one retards the stream, and the other retards the water in coming over?—Not in every case, as regards the lower stoppage, because there are some cases in which there is a slight fall between the two mills. But in every case a stoppage in the upper race or intake sends the water over the weir.

Mr. Macartney.

603. With regard to the mill race, anything which has an effect on the flow of the water might have an injurious effect on the mill above it by throwing the water back upon it, might it not?—Yes, by throwing the water back upon it.

604. Have you seen the gratings and lattices?—Yes, I have seen them in position.

605. What is your opinion of the effect they would produce?—It depends on the time of year and the quantity of debris that is coming down by the stream; but they may stay in very clear water unobstructed for perhaps an hour. In foul water they fill up at once, or in a few minutes.

606. What effect would that have on the power of the wheel?—That stops entirely the supply of water to the wheel and passes the water over the bywash.

607. In fact, the maintenance of lattices and gratings of the description which the millowners have been called upon to erect would practically annihilate the effective working of these mills, would it not?—It would absolutely annihilate the working.

608. In your professional experience there has been a great development of these turbine wheels, not only in this district, but generally, has there not?—Turbine wheels have become a necessity, due to their ability to work in what is termed backwater; that is, if the water under the wheel becomes flooded, an ordinary revolving bucket wheel gets partially filled up in the lower part of its circumference, and that greatly affects its power. A turbine wheel is not so susceptible to what is called backwater. The

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Mr. Macartney—continued.

improved drainage throughout the country has made the flow of streams less steady than it was many years ago. In my experience I have found that to be greatly so. A heavy shower of rain or a continuance of wet weather is drained off the land by the more perfect drainage, and sent down to the sea more rapidly. The backwater now rises in a very short time, and it has a very serious effect on the old type of wheel. This is not the case to an at all appreciable extent with turbines.

Chairman.

609. Are you speaking of an overshot or an undershot, as wheel?—Either; any wheel which depends on the water being taken on its circumference.

Mr. Tadmoun.

610. Or a breast wheel?—Or a breast wheel. A turbine is a submerged wheel, it works submerged. A breast wheel, or the other types of wheels, of necessity work above the water. If they are buried the resistance of the water in which they are buried stops their action.

Mr. Macartney.

611. I want to ask you a question about the Lisnasillan wheel, which has been mentioned here. Do you know that wheel?—Yes, I do.

612. Do you also know what I will call the shield, which is erected in front of it?—I do. I made the plates for it.

613. Is there any difference between the particular form of turbine at Lisnasillan and the turbines that are more generally used on other wheels?—The Lisnasillan turbine is what is known as a Macadam turbine, the prominent feature of which is that the ports for admitting the water into the wheel are smaller than those in the more modern types of wheel, such as the Leffel or Hercules, or similar types. The Macadam turbine is not being erected to the extent it was, because of the narrowness of its ports and for other reasons.

614. Apart altogether from the question of fish going into the turbine, it is absolutely necessary, is it not, to erect a shield like this to protect the turbine itself on account of its peculiar construction?—This particular turbine must be protected in a special manner.

615. It is more likely to be choked up and damaged, is it not?—Yes, it is more likely to be choked up.

616. Then does the shield or grating at Lisnasillan materially affect the power of the turbine there?—I should describe this grating more particularly. At Lisnasillan they have got a turbine, and other wheels. A portion only of the supply of water which arrives at the mill is taken to the turbine, and the intake of it is so placed that the gratings through which the water is strained on its way to the turbine are not only entirely submerged so that they do not catch any floating weeds, but they are placed in such a position that the current of water carries the weeds down to the breast wheel which is beside it. Do I make myself clear, sir?

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617. Hardly?

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Mr. WILSON.

[Continued.]

Chairman.

617. Hardly?—The material that comes down is floating material, as a rule.

618. If it goes over the top of the grating, would it not enter the wheel?—It does not go into the top of the grating. The top of the grating is closed.

619. It only goes through the lower part of the grating, does it?—Yes, it only goes through the lower parts. I will make a sketch of it.

Mr. Seton-Karr.

620. You have not brought any drawings of these things, have you?—No.

621. I have several here if they will assist you (the Honourable Member handed some drawings to the Witness)?—These drawings will not do in this instance. I will make a sketch if you will allow me. (The Witness handed a sketch to the Committee, and explained it as follows:—) The line of water flow from the head race runs past, like that, to a large breast wheel. In a recess taken from the side of that are the two laulets for the turbine. The main current of the stream passes straight down there. These two inlets are submerged under water altogether, so that the floating debris that comes down, if any, comes into this bay, flows over the top of the wheel. They are completely submerged. Although these holes are three-quarters of an inch in diameter, or were originally, but perhaps they are not so much now in consequence of rust, having been there 14 or 15 years, they still catch a lot of debris which gives a great deal of trouble.

Mr. T. W. Russell.

622. Will it be sucked down?—No, it is stuck in the poles.

Mr. Seton-Karr.

623. Where does that stream go on to?—That goes on to the breast wheel.

Chairman.

624. Supposing there were no breast wheel; some of the turbines have no breast wheel?—Certainly they have.

625. Then how do you keep the turbine clear?—It has to be frequently stopped to be cleared, but it is not so serious if there is a breast wheel. If this were a *cul-de-sac* all the debris coming down here would be strained through this place. This is the only instance in which a shield is put up as distinct from a grating, the advantage being this: a shield has a hole; if a body lodges in that hole, it lodges half-way through it and gets stuck. You can push it through or pull it out. A grating consists of parallel pieces of iron.

626. The owners themselves erected this grating, did they not?—They erected a shield. We distinguish the two things, a shield being a thing with a number of small holes, a grating being parallel pieces of iron.

627. Could a shield be constructed to answer the purpose of the millowners and the fishery owners also?—No; nothing which consists of holes would answer.

628. If it prevents the debris working into the turbine, it would prevent the fish working into the turbine, it seems to me?—As far as I have

Chairman—continued.

ever seen, fish do not get into the turbine. I want to put it perfectly clearly to the Committee, that any means of stopping the debris or fish, which consists of holes, will fill up and cannot be cleared. Anything that consists simply of gratings, which are parallel pieces of iron, placed together like that, can be raked out; you can clear it like the teeth of a comb. It is a comb, and by scratching along the teeth it can be cleared without difficulty. If they be 2 inches apart there would be no difficulty, but imagine the difficulty of cleaning a thing like that which has been produced.

Mr. Macartney.

629. With regard to this particular form of turbine, it is necessary for the protection of the turbine itself to put up this particular form of shield, is it not?—It is.

630. On account of the numerous small apertures?—Yes.

631. Your answer was quite independent of fish?—Yes.

Mr. Timbiam.

632. I do not quite understand what you mean by saying that there was a *cul-de-sac*. You would get no force of water down there at all if you had a *cul-de-sac*; you must have a mill race continuing beyond, must you not?—The flow of the water is divided; part goes on to the turbine and the remaining part goes on to a wheel further on.

Mr. Seton-Karr.

633. Could salmon fry be sucked down there?—No, I think not. Salmon fry never go head foremost into a suction hole. As a fisherman I say that.

Mr. Macartney.

634. There is very great difficulty in cleaning this particular form of shield, is there not?—Very great; they have to stop frequently to clean it.

635. Now I will go to the question of injury to the fish. You have just told Mr. Seton-Karr that you are to a certain extent a fisherman?—Yes, to a certain extent.

636. Has your attention been called specially to this question?—Yes, it has.

637. Has any instance come under your observation of injury to fish?—I have never seen or heard of any injury to them.

638. Have you devoted some time to observing the action of fish in the water?—I have, and there are one or two cases, especially at the Kells Bleach Works, where you have an exceedingly good opportunity of noticing whether fish pass over into the turbine or out of it.

Mr. Seton-Karr.

639. Whose works are they?—The works of Mr. Arthur, the last witness.

Mr. Macartney.

640. Will you give the result of your observations to the Committee, please?—The small fish, the fry, seem to creep round any little opening they can find. They seem to prefer a slow current, but when they come to any vibration

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Mr. WILSON.

[Continued.]

Mr. Macartney—continued.

tion or any speeding through which the water is sucked rapidly, they turn tail and go back.

641. There is very considerable vibration from the working of the gearing of these wheels, is there not?—Very considerable. I have noticed that the fish will approach the entrance to a breast wheel much closer than they will to a turbine wheel, and that with the breast wheel there is less vibration. You will frequently see them playing about in the little still water there in front of a breast wheel.

Chairman.

642. There is less traction from a breast wheel than from a turbine wheel, is there?—No, there is the same. Whatever the fall may be, there is the same flow into it.

643. But if the turbine wheel revolves with greater velocity it would create a greater traction of the water towards the mouth where the water enters, would it not. That is a necessity?—Perhaps I can make that clear to you by showing you the construction of a turbine. This is a very common form of construction of turbine (the witness handed a sketch to the Committee). Looking at it as a section through the turbine, this is the wheel proper; here is the water coming in from the head race. There is universally fitted a grating, to keep pieces of wood from getting into the turbine in front. This frame is always full of water right down to the blades of the turbine, but the speed of that water down to the blades of the turbine must be kept slow. It is only at the very blades of the turbine that the water attains its speed, and the speed is then taken off, and it is from the taking off of the speed that the power is derived.

Mr. T. W. Russell.

644. The traction, I suppose, would be there?—Yes, at the blades. But here outside there is no such traction at all; there cannot be.

Mr. Macartney.

645. You have mentioned that this is a peculiar form of turbine; it is not the common form in use in the district, and I believe none of the other turbines with which you are acquainted are McAdam turbines?—No, they are either Lefell or Hercules turbines.

646. In all your experience have you ever found any trace of fish when examining them?—No, never.

647. Have you found traces of anything else; eels, for instance?—Yes, I have found eels frequently, and that is due to the fact that an eel can swim down a current head foremost. A salmon fry or a salmon smelt. They always drop down tail foremost, except when they are hooked and running on the line, and then they will go anywhere.

648. Having had considerable experience in this matter, and having examined all these races, is it your opinion that it would be impossible for mill-owners to get fish working through the turbines if any further erection than that of the ordinary grating was put up in front?—Anything additional to what they have?

649. Anything that would diminish the flow?—It would be a question of degree.

680.

Mr. Selous-Kerr.

650. Do you know Mr. Webb's place?—Yes. I made the gear in connection with it.

651. He has not any grating of this kind that you have shown us, has he?—No.

652. It is quite a different class, is it not?—It is a spur bridge with parallel pieces side by side.

653. Do you think if he had this arrangement in front of his turbine it would affect the flow of his water?—Yes; he takes all his race into the turbine.

654. Will you tell the Committee exactly why Mr. Webb could not have a grating of this kind in front of his turbine?—The result then would be that the water from the head race came into a cul-de-sac, and all the debris floating down must pass into the turbine.

655. This is a drawing, I believe, of the Llanafyllan Mill (handing a drawing to the witness)?—Yes.

656. Does he require a greater flow of water than at the Llanafyllan Mill?—He does.

657. Do you tell the Committee it would be impossible for Mr. Webb to have a grating there?—Absolutely impossible.

658. If he had, would it stop his machinery?—It would.

659. Did you ever see a turbine stopped by anything getting into it?—Yes.

660. How, and what?—I have seen pieces of timber catch into it, and break a blade of the turbine, and this blade catch and stop the turbine.

661. Have you ever seen it stopped by an eel getting into it?—Oh, no.

662. It would have no effect upon the turbine, I suppose?—Not the slightest.

663. Would it kill the eel do you think?—Yes, I should say so, if it was long enough; it depends on the size. I should say the probability is it would kill an eel 15 inches long; a smaller it would not.

664. Do you think if salmon fry got into a turbine it would not hurt them?—I think not; it is only speculation. I have never seen one hurt.

665. Do you think fry do get into these turbines?—I do not think they do.

666. I am alluding to turbines like those at Mr. Webb's mill, which are not protected by gratings such as you have been describing?—I may tell you that I have seen at Mr. Webb's the salmon fry in the race above the turbine at a little distance; but close to the turbine I have never seen any.

667. Do you think it is possible for fry to go down into the turbine at Mr. Webb's Mill?—"Possible" is a very large order. I would not say it was not possible for them to go down, but I think it extremely unlikely.

668. What is the fall at each of Mr. Webb's turbines; have you told the Committee that?—No, I have not; but I think I have it here. I think it is 12 feet 6 inches. I cannot say my memory at present.

669. That is the fall where the water commences?—The fall is always reckoned from the top of the head race to the tail race.

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670. What

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Mr. WILSON.

[Continued.]

Mr. Selous-Kerr—continued.

470. What kind of fall is that?—It is a medium fall.

471. What is the size of Mr. Webb's turbine?—I am afraid I cannot give it, except from memory, but I believe it is a 60-inch one.

472. Do you happen to know what number of revolutions it makes in a minute?—I do not know from memory.

473. Then you think that fry could pass through his turbine, from your recollection of it, without being injured?—Yes; I know that the parts in Mr. Webb's turbine are sufficiently large for that. I should think a tall hat would get through. I do not suppose it would be very much better of it, but I do not think it would be caught. They are very large openings.

474. You said that you had never seen salmon fry in the turbine?—I never have.

475. I suppose it is quite possible that fry might pass through a turbine, and be injured, and get carried away in the tail race without your seeing anything of them?—I do not think it is likely, because fish do get through the turbine, and do get injured, one does see.

476. Do you think the same rule would apply to fry?—Yes, or any other fish.

477. But still you are not prepared to say it is not possible for fry to pass through and be injured, and yet to see nothing of them?—I am not prepared to say so.

478. Will you kindly look at this plan, which represents a sectional elevation of a turbine, does it not?—Yes.

479. And this is the head race, is it not?—Yes.

480. Do you understand this plan?—I do.

481. Have you seen one before like it?—Not exactly like it, but the Lismillan one is very much on the same principle, except that I do not know whether the head race divides further up or not.

482. Do you understand here that this is a grating which is below the surface of the water?—I do.

483. And the supply of water to the turbine comes through the grating, and then down, does it not?—Yes.

484. I wish to ask you whether you think, supposing a grating like that was put in a mill race (say, like Mr. Webb's, for example) it would affect the run of his turbine?—It would totally stop it.

485. Are you certain of that?—Perfectly certain.

486. Why?—All the material that comes down this head race must be strained through that. A leaf, or a little bit of stick, or whatever it is, gets stuck half way through, and you cannot get it cut; for instance, you see it stuck here in this lattice.

487. There is no bye-wash, is there?—There is a bye-wash there, but no second wheel.

488. Supposing the flow of water was sufficient to enable you to have a bye-wash to carry off part of the race, would not that do away with your objection to that kind of grating?—If the millowner were prepared to throw away, by letting water pass through a bye-wash, a large proportion of his power, and so skin the water,

Mr. Selous-Kerr—continued.

and put away a good deal of the milk with the cream, he would be probably able to work it.

489. You think he would?—Yes, at a loss of possibly one-third power. It depends on the time of year and the quantity of stuff coming down.

490. Then it would depend on the flow of water?—And on the stuff that comes down.

491. Then in that case, supposing the flow of water sufficient and a suitable bye-wash put in, a grating of that kind would be feasible, you think?—Yes.

492. Without interfering with the working of the turbines?—It would interfere with it comparatively slightly.

493. Do you know the mill race of Mr. Webb's mill?—Yes.

494. Do you think he could put in a bye-wash and a grating of that kind?—No.

495. Why not?—He could not afford to lose all his power.

496. Has he not enough flow?—I understand that it is little enough on some occasions.

497. I wish you to tell me the number of revolutions of Mr. Webb's turbine per second. Can you make a calculation of that?—I cannot except from memory.

498. Can you give us an idea of what the number of revolutions is?—About 180 per minute, I think; that is my recollection; it is not more than that; I should say it is probably less.

499. That is nearly three a second, or $\frac{3}{4}$ a second, is it not?—Yes; I fancy I must be too high; I cannot tell you exactly.

500. Do you really think if fry got into a turbine revolving from two to three revolutions per second, they would go through without any injury?—I think it is quite likely.

501. Is that photograph a fair picture of a turbine (bearing a photograph to the Hercules)?—This is a Hercules turbine; it is not a Lefell. Here is a Lefell. It is what is known, generally speaking, as a high-fall Lefell.

502. Which has Mr. Webb got?—Neither of these show exactly Mr. Webb's. He has got a horizontal wheel. This is more like Mr. Webb's.

503. Which is the best of these two turbines from a millowner's point of view, and which is the more modern?—Do you mean of the Lefell and Hercules?

504. Yes?—They run pretty nearly neck and neck.

505. Is there any difference if the fry run in, in their passing through one or the other?—None.

506. Putting the fishery owner's interest entirely out of the question, what kind of grating would you say was necessary for a millowner to have in front of either of these two kinds of turbines in order to protect it properly?—He must have a grating that would prevent any pieces of wood, for instance, getting into the turbine which could damage it and break it.

507. What would be the distance between the bars of the grating?—As to the Hercules or the Lefell turbine, I consider it would be very safe with inch-and-half spaces.

706. And

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Mr. WILSON.

[Continued.]

Mr. SEAN-KARR—continued.

708. And it is necessary for him to have a grating of that kind, is it?—He must have; he might get boughs in.

709. And what you say is that a smaller grating or latching practically stops his machinery?—No. What I insist upon specially is that the grating which is put in must be of such a nature that it can be cleaned out without stopping the mill. You cannot clean out any grating which consists of holes. You can clean a grating which represents a comb, but you cannot clean a grating which is a sieve.

710. At the same time you have qualified that with regard to Glinafflan Mill?—I have, but I have stated that even with the precautions taken there, and, even with the fact that there is a large quantity of water passing the special turbine grating, with all these nets before it, it gives a great deal of trouble.

711. But still the mill is worked?—Still the mill is worked.

712. The trouble you allude to is the cleaning of the grating, is it?—The trouble is the stoppage of the mill due to the necessity of cleaning it.

713. You say that in Mr. Webb's mill race, for instance, you cannot have this same arrangement owing to the flow of water there being smaller, I think?—No, it being all absorbed by the turbine wheel.

714. That comes to the same thing, does it not?—Yes.

715. With regard to the gratings at the foot of the tail race, would a grating at the foot of a tail race put there to prevent salmon running up into the tail race affect the working of a turbine in any way?—No; if it is made wide enough in the mesh, and broad enough, and if it is kept clean.

716. Is there such a grating in the tail race of Mr. Webb's mill?—No.

717. Supposing a grating was put there (I forget the exact technical expression) pointing down stream so that you could open it and let all the rubbish out, what would you say?—Do you mean a gate grating?

718. Is there not some other technical expression for that?—I do not know of any.

719. A gate grating placed like that could not possibly affect the working of the turbine, I suppose?—Not if it was kept clean, and there was sufficient area.

720. The simple process would be every now and then to open it for five or 10 minutes so as to let all the debris collected there wash down, and close it again, would it not?—I fancy that would not clean it. The weeds and leaves lodge against the spars and bars, and they would have to be raked out.

721. If it was made in such a way that the gate pointed down stream so that it could be opened quite easily, surely the cleaning that you mentioned just now would not be necessary?—That would not clean the bars.

722. Could it not be made in such a way as to do it?—No; pieces of leaves lodge round the bars something like this fashion. The water comes and folds it round like that, and you have to scratch it up.

0.80.

Mr. SEAN-KARR—continued.

723. That would not be a very hard job, would it?—It is a question of degree, of course, as to where the grating is. It might be close to or at a distance.

724. Do you know of any tail races where such gratings exist?—I know of tail races where they have been put in and removed, but none where they exist at the present time.

725. They have been removed, you say?—Yes.

726. For what reason?—They got stopped up with leaves and raised the level of the tail race, thereby raising the level of the water underneath the breast wheels that were discharging into this tail race.

727. The reason of that, of course, was that they had not been properly cleaned, I suppose?—That they were not cleaned, you may say.

728. Supposing they had been made with the gates pointing down stream in the way I have suggested or described, do you think they would have been obliged to take them away?—Unquestionably; I do not mean to say the gates would answer the purpose, because I do not think they would; but if the gates were kept clean and the flow of water not impeded, there is no objection in the world.

729. But gates constructed in that way would materially assist the process of cleaning, would they not?—As a matter of position there are no large sticks that come down there, for they all intercepted before the water arrives at the wheel.

730. Then all the debris is simply there?—Yes.

731. What time of year does the debris come down most?—I fancy from the time they begin to cut grass.

732. In the autumn in other words?—No, a good deal earlier than that. Beginning about May, heavy showers come down and wash a good deal of the cut grass into the little rivulets, and that is swept down. Very heavy quantities of hay come down, and the weeds which grow on the margin of the rivers are pretty stiff till spring comes on, and then they drop down and decay, and are supplanted by the fresh growth.

733. In what month would that be?—About the beginning of spring; about April. Then there is an entirely different cause in autumn, that is, the dead leaves falling, but I do not know that that is quite so much drawback as the grass.

734. Are you prepared to say much debris comes down in March, April, and May?—I am not prepared to say there is much in March, but in April and May decidedly a great deal comes down.

735. As much as at any other time of the year?—Yes, I am disposed to think May and June will represent the maximum. It gets up to its maximum in May or June. There is some ice occasionally in March that bothers them, but it does not always happen. We have had a good deal of ice this year in March.

Mr. T. W. Bussell.

736. This is an exceptional year in that respect, I think?—It is rather. Now on the 17th March there was a great deal of ice up there.

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737. Do

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Mr. WILSON.

[Continued.]

Mr. Seton-Karr.

737. Do you know Mr. Dinmore's turbines?
—Yes, very well.

738. What is the fall there?—Twenty-five feet.

739. That is a much stronger race than Mr. Webb's, is it not?—It is a higher fall, but it is not nearly so large a quantity of water.

740. You say you are a fisherman: do you think that in a mill race of that kind, supposing fry got into it they could swim easily back into the river again without going down the turbine or the bye-wash at the other end?—If you will show me your drawing, I will explain in a moment how it is. The flow of water round here, and the flow of water all round that pipe until it comes actually to the turbine, does not exceed perhaps three feet a second, or less than that, two feet a second, and fish can very easily swim against that without the slightest difficulty.

741. What is the velocity of the water at this part of the race?—It goes down to six inches a second.

742. In other words, you tell the Committee that fry coming into this race and swimming down, supposing this represents the millrace at Mr. Dinmore's, could easily swim back again and get into the river?—Easily, I have seen them constantly doing it.

743. In Mr. Dinmore's race, could it be possible to put up a grating of this description in front of his turbines?—No, Mr. Dinmore has nothing but turbines.

744. Would it be possible to put a grating in front? It would not.

745. For what reason?—For precisely the same reason. It would stop the flow of water.

746. Are you prepared to say what you said with regard to Mr. Webb's, supposing a suitable bye-wash was made to carry away a part of the floating debris and so on, that in such a case such a grating could be put there?—No, I say it is on all fours with Lisnafellan, and that it is the same conditions exist as at Lisnafellan—

747. I am speaking of Dinmore's?—Dinmore's and Webb's are precisely the same.

748. Mr. Dinmore's has a greater fall, has he not?—Yes.

749. Then you say such a grating as this could not under present conditions be put there?—It could not be put there.

750. And the same remarks apply to the diagram you have drawn, do they?—Yes, the Lisnafellan grating differs in no essential particular from this.

751. The principle is precisely the same, you say?—Yes.

752. It is a perforated plate sunk below the level of the water?—Yes. I would point out to you in a case of that sort how manifestly impossible it would be to clean holes like that, deep under water. It would be entirely impossible to do so.

753. But they do it at Lisnafellan all the same, do they not?—They do it in a peculiar way.

754. How?—They have to stop the place.

755. But you said just now the running of their mill was not affected by it?—No, I did not say that. I said the owners would speak to the trouble it had given them. I do not know,

Mr. Seton-Karr—continued.

except from having heard from them, that they had to stop to clear the dirt out. You will have the owners of Lisnafellan to speak positively as to the injury which has been done them. It is only hearsay on my part.

756. I want to ask a question about the speed of the wheel at Mr. Dinmore's turbine?—I can give you that.

757. Can you give us the speed at which the outside of the wheel revolves?—Twenty-eight feet per second.

758. That is the speed at which the outside of the wheel revolves, is it?—Yes.

759. And you still adhere to your opinion, that supposing by any chance fry got into a wheel of that kind, they are not likely to be injured, do you?—Yes, I still adhere to that opinion.

Mr. T. W. Russell.

760. What is the special business carried on at Lisnafellan?—Bleaching, scrubbing and drying. I think they do a little dyeing, but it is bleaching and finishing principally.

761. Have you heard anything regarding the diminution of fish in these rivers?—Yes, I have a great deal.

762. Have you any theory as to the cause of it?—Yes, I think the principal cause is the difference in drainage.

763. Will you explain that please?—The farmers have drained their land, especially in the north of Ireland now, to a very much greater extent than used to be done, and fields which were of the nature of a sponge, and which retained a heavy fall of rain for several days, now are so well drained that the water falls and goes straight into the drain pipe. From there it runs freely down the stream to the main river and is rapidly discharged. Then comes a period of perhaps drought. There is no sponge gradually feeding these small streams; it is exhausted; the runs has gone away, and that is a very serious thing to the fish. These little rivulets up which the salmon frequently creep, are now dry between showers, and when a shower comes on there is a roaring current for a little while and then it ceases. That is one reason. There has been another reason which has been told me and spoken of a good deal, namely, the presence of pike in the rivers. Fishermen tell me there are more pike now, but personally I do not know that.

764. They are very destructive, I believe?—They are, especially on fry.

765. Is poaching more prevalent?—No, I do not think it is more prevalent.

Mr. Fitzkettle.

766. I understood you to say you have found eels in the turbines?—Yes, it is not an uncommon thing to find them.

767. Are they dead?—Yes, dead.

768. Then you said eels could float down a stream that an ordinary fish could not?—An eel, as probably the Committee may know, spawns in the sea, and the young eels come up the river in the form of fry. They do exactly the reverse of salmon. Salmon come up and spawn in the rivulets and go down to the sea. An eel does exactly

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Mr. Wilson

[Continued.]

Mr. Piskerton—continued.

exactly the reverse; an eel has not gills like salmon have, and can go down a stream without suffering any trouble or injury. A salmon cannot; it would be drowned, as the fishermen say.

769. In order to protect itself it must swim with greater rapidity than the flow of the stream?—Yes.

770. And, therefore, it is impossible for a salmon to go down a mill race with safety, you think, is it?—If it feels itself going too fast, it turns about.

771. Is the rapidity of the flow in Dinmore's race one reason why salmon fry could not swim to the wheel?—They could, but they would not.

772. They must keep their heads up stream?—They must keep their heads up stream.

773. You said you had no experience as a fisherman; do you not fish yourself?—Yes, I do.

774. Does not the vibration of the turbine keep away the fish?—It does; they will not come near it.

775. Suppose that it is necessary to erect these safeguards, in your opinion, is the millowner entitled to put himself to expense to safeguard the interests of other people?—That does not precisely come within my professional line, but my feelings are certainly that they should not.

Mr. Piskerton—continued.

776. As you are a practical man, and know the cost of erection, you can form a very correct estimate about the serious injury that would be forced upon millowners to erect these safeguards, can you not?—I would look on the erection of them, in the first instance, as a bagatelle as compared with the ultimate serious effect of them when once they are erected. The millowners, for their own protection, erect gratings before all wheels to prevent pieces of wood coming down.

Mr. Cox.

777. You have some practical knowledge of the habits of fish, I understand?—I have some knowledge; I have made it a very interesting study.

778. I see there was a resolution passed in Denry some time ago, and adopted by the Board of Conservators of Sligo, and they say here, "that turbines are the most destructive class of mill wheel to salmon, salmon fry and trout." Do you think so?—I do not.

779. "That the Bill to amend the Salmon Fisheries (Ireland) Acts will, if passed, work a forfeiture of existing private fisheries rights, as well as destroy a source of food for the public without any equivalent public or private benefit." Do you agree with that?—No.

Mr. CORNELIUS CADLE, called in; and Examined.

Mr. Macartney.

780. Are you a mechanical engineer, carrying on business at 36, Wellington Quay, Dublin?—Yes.

781. I believe you have had great experience in water wheels of all descriptions, especially turbines, both in England and Ireland?—Yes.

782. Will you give an estimate to the Committee of the number of turbines you have erected in the last 25 years?—About 300.

783. Is that in England and Ireland?—That is in England and Ireland, and some in Scotland.

784. Can you give the Committee any idea of the number you have erected in Ireland?—About 125 to 130, I should say.

785. There has been a considerable development in that particular branch of your trade in Ireland of recent years, has there not?—Yes.

786. Are you familiar with the district in which these mills are situated?—I am.

787. And with the gratings and lattices which the mill owners have been called upon to erect?—I am.

788. Of course, it is part of your business to estimate the amount of power that can be derived from the water when you are putting up a wheel?—It is.

789. In your opinion what would be the effect of maintaining these gratings and lattices upon the power to be got from a turbine?—If a 30c grating is maintained it means the total destruction of the power to the wheel from the stream.

790. With regard to the injury to the fish, in 0.60.

Mr. Macartney—continued.

your experience has any injury been ever brought under your notice?—None.

791. Either in England, Scotland, or Ireland?—None whatever. In fact, I have often watched the tail race myself to see if I could see any injury, both when the wheels were at work and when the wheels were stopped, at dinner-time and breakfast-time, and more particularly I have watched at Hill's Factory at Luton, near Dublin, where they have two turbines, and I have often seen as many as half-a-dozen salmon as the water discharges in the tail race. There have been sometimes four or five or six fine fish there.

Mr. T. W. Russell.

792. Had they gone through the turbines?—No, they were coming up the tail race instead of going up the ordinary course of the river.

Mr. Macartney.

793. This evidence applies to your experience in England as well as in Ireland, does it not?—Yes.

794. I believe you have been consulted as to working turbines in the River Exe?—Yes.

795. That is a salmon river, is it not?—Yes. I have had a good deal of experience on the Exe. I suppose, at one place and another, there are 15 to 20 turbine wheels on the Exe.

796. Supposing salmon fry were to go through the turbines, do you believe they would be injured?—No, I do not.

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797. Can

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Mr. CADLEY.

[Continued.]

Mr. MacCarthy—continued.

797. Can you give any instance to the Committee of your experience of articles which have passed through?—Yes, on one occasion at Derron Mills, Queen's County, when I was erecting a 52-inch turbine, I saw before the rubbish rack was put in a piece of deal two inches square and nine inches long.

798. It passed through?—It had passed right through without any injury, without even a mark on it.

799. Coming to the Lissadill Mills, do you know the turbine there?—I do.

800. And you know, I think, the shield grating that is in front of it?—Yes.

801. In your opinion, does that shield grating diminish the power of that particular turbine?—It does, considerably.

802. Have you heard Mr. Wilson's evidence?—Yes.

803. Do you agree with him that this particular wheel requires a special grating of that sort to protect it?—Yes, it does.

804. On account of the difference in the formation of the apertures?—Yes, of the buckets.

805. In this district is there any other wheel of the same description. Is there another McAdam wheel in this particular district?—No, I do not know of any other.

806. If this peculiar form of shield grating was put up before Mr. Webb's or Mr. Dinmore's or any other mill there, what would be the effect of it in your opinion?—The head would be diminished to such an extent that the wheel would scarcely be able to work. In fact, it would be utterly impossible to get the water down to it.

807. Will you tell the Committee your opinion, please, as to the value of the turbine wheel in Ireland with regard to manufacturing processes, having regard also to the water power of the country?—The value of it compared with the ordinary water-wheel is this, that you can get from 25 to 30 per cent. more power from the water.

Mr. Stowe-Kerr.

808. Is that as compared with a bucket wheel?—Yes. Also you can gain considerably more fall than with the ordinary water-wheel; at least 20 per cent.

Mr. McCartney.

809. Some witnesses have made statements here as to the steadiness of the drive. I believe that has also another value?—Yes, it is much more uniform and more valuable, especially in weaving and spinning.

810. I will put it generally to you: In your opinion, would it be a very disastrous thing for the country if the turbine wheels were closed down?—Yes. In fact, it would prevent all industries which exist that are at the present time worked by water power.

811. Do you produce a model of a turbine?—Yes. This model is divided into two sections.

812. Which turbine is that?—This is the Loeffel. (The witness explained the model wheel to the Committee.)

Chairman.

813. Does the actual fall make any difference?—Yes: the moment the fall decreases the smaller will be the revolutions of the wheel.

814. Then the greater the fall down this pipe, the greater the power of the wheel?—Yes.

815. And if the water came from 25 feet it would be much greater than if it came from 12 feet, would it?—Quite so. You see I have tables here, prepared specially to show the force. In Mr. Webb's case, for instance, one wheel gives 46 and the other 72 horse-power.

816. Is that derived from the difference in the fall?—Yes.

Mr. Cur.

817. What is the size of these buckets?—The depths between the top and bottom flanges of the wheel is approximately about 18 inches, so that you see each of these buckets is about nine inches square.

Mr. Tomlinson.

818. You stated something about having seen some salmon going up the mill race instead of up the main stream?—Yes.

819. Would you consider that an exceptional circumstance?—Yes.

820. Are you acquainted with the habits of salmon?—I have watched them for years, both on the River Exe and the Liffey at Lucan.

821. The Exe at Exeter, you mean?—Yes.

822. Is the Exe provided with salmon ladders?—Yes, I believe so, at the weir.

823. You do not know that from your own observation, do you?—I think I have noticed them, but I cannot be sure.

824. Have you seen the salmon going up the mill races in the Exe, or only in Ireland?—I saw one in the tail race in the Exe, but immediately the wheel was stopped, and the fish found itself getting into low water, it at once returned down to the main stream.

825. Is it within your experience that there is a deficiency of salmon ladders in the Irish rivers?—I should say so.

826. It might be that the fish went to the tail race because they could not get over the dam, might it not?—That might be possible. I think at Lucan there is only one in the river at the weir.

827. Should you say the salmon by preference would keep to the main stream if they could get up?—I think so, if they could get up.

828. They might go to the weir because they could not get up the main stream?—That is so.

829. Now as to this McAdam wheel, protected with a shield, would it be a suitable one for a weaving factory?—I do not think it is so steady as some of the modern wheels.

830. Do you know of any being used at a weaving factory?—I do not.

831. I think you explained that the lower the fall the larger is the wheel required?—Yes.

832. So that in case of a fall which would only take an undershot wheel, you would require a very large turbine, would you not?—Yes, perhaps varying from 40 to 65 inches, or even up to 72 inches; I erected one at Stroud, in Gloucester,

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Mr. CADLE.

[Continued.]

Mr. Tindal—continued.

center, 72 inches in diameter, on a three-foot fall.

Mr. Selou-Karr.

833. I want you to tell us a little more about the fish you saw in the tail race; did they go back into the river?—Yes, when the wheels were stopped. Directly they commenced to stop the wheels, the fish made their way back again.

834. They felt the water leaving them, and went back with it, did they?—Yes.

835. Is there any danger of salmon being left high and dry in a tail race?—I think it is a very rare occurrence.

836. Has it ever happened in your knowledge?—I heard of a man taking salmon out on one occasion, but only one.

837. Where was that?—Lucan.

838. Where the mill race takes nearly the whole flow of the river, I suppose it would be very natural for salmon ascending the river to go to the tail race?—It might be in very shallow water.

839. Do you not think it would be necessary, in order to protect the salmon, that there should be a grating at the end of the tail race?—I do not see how it could be constructed, because in the autumn in particular there would be such an immense quantity of leaves coming down, that it would require some one continually to keep it clean.

840. Do you not think it would be possible to keep it clean without very much labour, if it were a large grating?—If it were a large grating it might, because the leaves would be thoroughly well strained by the fine grating above the wheel.

841. I am not alluding to a lattice, but to a grating sufficient to keep salmon fry from ascending the river?—The grating I recommend in all cases is a sloping grating of this description, which will, to a certain extent, naturally keep itself clean; you see the current of the water drives the leaves and rubbish upwards.

842. There would be no objection to a grating of that kind at the end of a tail race, would there?—If it is too fine there would be.

843. I mean sufficiently fine to prevent salmon from ascending the tail race, that is all. Would there be any objection to one of that kind?—I should say not, not if there is ample space left to allow rubbish to go through.

844. Do you know of any grating existing of that kind?—No, I do not know of any.

845. You said that the turbine gave 25 per cent. more power than the ordinary bucket wheel?—Yes.

846. Do you know the Zion Mills, County Tyrone?—No, I do not.

847. You know nothing about them?—No.

848. Have you not heard anything about them?—No, I have not.

849. Do you not know that they have a bucket wheel there by preference?—I do not.

850. All the mills when they have turbines require dams, of course, to be erected, do they not?—They require a weir.

851. Does that not give great facilities for poaching?—Well, I cannot say from experience; I never heard of it.

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Mr. Selou-Karr—continued.

852. Have you never heard of the poaching of fish ascending the weirs?—No, I have not.

853. Would you mind giving me the model of the turbine you produced; I want to ask you a question about it. I believe we were told by the last witness that the outside of this wheel revolved about 28 feet per second. That would be the wheel inside there, would it not?—Yes.

854. And the outside circumference of that wheel revolves at the rate of 28 feet a second, I understand?—Yes.

855. Is that an ordinary rate?—Yes.

856. And the actual revolutions of that wheel would be about two or three per second, would they not?—Have you any idea of the diameter of the wheel of which you are speaking?

857. It is the wheel at Dinmore's?—It is a 35 feet fall, but I do not know the diameter of the wheel.

858. Under those circumstances, looking at this model, do you really think that fry getting on there could go through without injury?—Yes.

859. Have you ever seen any fry go through a turbine when you have been watching a tail race?—No, I have often seen small fish come up, particularly to the grating, and directly they approached the grating, and found the vibration of the bars from the current passing through, they have turned tail.

860. That would be above?—Yes.

861. Have you ever seen any fry dropping down the tail race, apparently having come through the turbine?—No, I have never noticed that at all.

862. Have you ever seen any fry in the tail race at all close to the turbine?—Never, and I have been both on the Exe and the Liffey at all periods of the year.

863. You have never seen fry then in the tail races?—No.

864. Have you ever seen dead fry?—No, I have not.

865. Have you watched for them?—I have watched for them, and particularly when the wheel has been stopped. I know at Sligo when I was putting up a wheel there some time ago, they asked me the question; would the turbine destroy small salmon if they went through, and I said I did not think it would do so.

866. I suppose it is quite possible that fry might be killed going through a turbine like that, and their bodies carried away down the tail race without your seeing them?—It might be possible, but I have never observed it, and I frequently asked the millers at the various mills if they had ever observed any destroyed fish, but they have never seen any.

867. What is the water like when it comes out of the tail race, clear or thick?—If there have been no floods it is generally pretty clear.

868. I mean when the mill is working there is a good deal of foam on the water, is there not?—No. If the head race is constructed of sufficient width in order to prevent too great a velocity, the water should not flow more than a foot a second to the wheels. It flows away about five or six feet a second.

869. Was the water clear in the mill races you have watched?—In summer time, when the

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water

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Mr. CADLE.

[Continued.]

Mr. Seton-Karr—continued.

water was naturally clear in the river, it would be clear in the tail race.

Mr. O'Neill.

870. I want to ask you about the salmon in the tail race at Lucan. I understand you think there is no necessity for a grating in that tail race, because there is no danger to the fish if they happen to go up the tail race?—If they went up, they could not possibly go through the turbine, and could not possibly be injured in a turbine.

871. You think they could not go into the turbine at all?—No.

872. In reply to a question by Mr. Seton-Karr, you said that if the whole of the water had to be taken up in a mill race, leaving the river dry, then the salmon must come up the mill race?—Yes.

873. But do they, because do not salmon run only in flood?—They would make their way up as far as the wheel, but no further.

874. And if they were likely to be left high and dry, you think they would swim out again?—I have seen the fish at once return and go down the stream again to the river when the wheel is being stopped.

875. So that there is no necessity for a grating at all, you think?—No, I think not.

876. Have you ever seen gratings at the end of a tail race?—Never.

Mr. Pinkerton.

877. Mr. Wilson stated in his evidence that where five or six mills were on the same stream, that obstruction to the intake affected all the mills: has that been your experience?—Yes, where there are a number of them. I can give you an instance on the Stroud Water in Gloucestershire in particular. The mills are one above the other, and all depending on very low falls, and if a mill above is stopped by any cause then the mills below have to stop too.

878. Then it amounts to this, that a lower mill is dependent on five or six gratings?—Yes, you see each mill has its own strainers.

879. Obstructing the flow from the lower mills by back waters injures the upper mills where the fall is not great, does it not?—Yes, especially if the lower mill cannot take the water as fast as it is let down.

880. So that the lower millowner is not only dependent on his own gratings, but is left to the mercy, to a great extent, of those above him?—Yes.

881. Under those circumstances, do you think it is possible for millowners to carry on their work with all these restrictions?—I do not see that they can, very well. At a place near Bath-on-the-Avon, in the morning during the summer months, say June, July, August, and even September, I have seen the water two feet and two feet six below the weir, which is 271 feet across, and they would have to wait until 10 o'clock in the day before the river would fill up; that is, waiting for the mills above; for instance, the mills at Trowbridge and higher up the stream to start. It takes several hours for the water to come down.

Mr. Pinkerton—continued.

882. Mr. Seton-Karr asked you some questions with regard to the clearness of the water; I suppose you have no difficulty in ascertaining whether fish have been injured in passing through?—If they were I think you could see them.

883. You stated that a board two inches thick and six inches long had passed through a turbine?—Yes.

884. And there were no marks of injury upon it?—None whatever.

885. Do you think there is no possibility of injury to fry passing through unless by an accident?—I think so, unless by an accident.

Chairman.

886. Have you constructed a great many of these wheels?—Yes.

887. Do you thoroughly understand the whole machinery of their construction, and the necessities for their work?—Yes.

887^a. Has it ever occurred to your mind that it is possible to construct such a protection against a wheel which would be likely to draw these fish in without interfering with the valves of the wheel?—Do you mean in the grating above?

888. Yes, in the grating above?—The advice I give to all millowners is to put in a coarse grating, say 2½ inches apart, up the stream to take the coarse rubbish, and to put one lower down with bars, say an inch and a-half apart, and not closer. Then if the head race is of sufficient width it does not diminish the supply of water to the wheels.

Mr. Pinkerton.

889. Would that prevent fry getting through?—They would go through in case the current was strong, or they might get down during the period the mill was standing idle.

Chairman.

890. You say fry would go through?—Yes; I have watched fish often, and I have seen them strike against a stick sticking up, and directly they have touched it they have turned up stream again.

891. Would it be a benefit to the millowner to prevent debris getting on to the wheel? Is it a disadvantage for it to enter the wheel?—It is, because there would be the danger perhaps of choking or fouling the wheel, and a quantity of it collecting in the cistern or flume.

892. So that the gratings you suggested, if constructed, would be of benefit to the millowner?—Yes.

893. Would those gratings require clearing? Occasionally, during the autumn months several times during the day.

894. But there would be no difficulty in that, I suppose?—No, not with a rake.

895. During the spring, when I understand there is a greater quantity of debris, if the mesh or the width of the grating were somewhat reduced, would that prevent the fry getting down?—Do you mean by placing a fine net grating?

896. I mean by reducing the grating somewhat?—I do not see how you possibly could, unless

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Mr. CADGER.

[Continued.]

Chairman—continued.

unless you increase the width of the stream considerably.

897. What is the size of fry?—If I understand the term right, salmon fry are little fish about the size of minnows.

898. Then you say that any obstruction turns them round?—Yes; I have seen small fish a few inches long, directly they have approached the gratings or any other obstruction, at once turn and go up stream again.

899. Would not the gratings which you have been speaking of, of 2 inches at the upper end, and 1½ below, turn them?—Yes, if they came and found the obstruction.

900. You think it would turn them?—Yes, a fish as all times is naturally very timid.

901. So that you think it would be possible, with a little ingenuity, to construct such an obstruction across the stream which would not interfere with the mill, and which would turn the salmon fry, do you?—Yes.

902. At all events, it would be simply a question, first, of the construction of these gratings; secondly, it would be a question of keeping these gratings clear?—Yes.

903. But do you think if that could be accomplished, it would be a benefit to the millowner to carry it out?—Yes, it would be a benefit to the millowner.

Mr. Macartney.

904. But it would depend upon whether there was sufficient room to widen the race in order to give a sufficient head of water, would it not?—Yes.

905. That is to say, your suggestion of a grating at the intake, and another grating in front of the turbine wheel, unless there was also a long space of ground to develop a sufficient power of water, would break down altogether?—Yes, you must have that.

906. And, of course, as you are well aware, it is not always possible, owing to the natural formation of the ground, to construct a head race, is it?—It is so in some cases, but, generally speaking, when the power that the stream will afford has been ascertained the head race has been constructed to suit the power of the wheel.

907. Quite so. No one, of course, would build a mill unless he could get sufficient power. Owners are not likely to invest their capital until they are sure of that, are they?—No.

907.* But you are making a fresh suggestion, which I quite agree might, under certain circumstances, be feasible, but there are circumstances where it might not be feasible, because it depends entirely on the possibility of being able to construct a head race which would give you a sufficient volume of water to counteract the stay upon the power of the water, which would result from your putting in gratings at the intake; is that not so?—Yes.

Mr. T. W. Russell.

908. Do you know Mr. Webb's mill?—I do.

909. What would be the effect of introducing

Mr. T. W. Russell—continued.

a grating such as you recommend on Mr. Webb's mill just as it is?—I have not been up stream beyond Mr. Webb's at all, so I do not know what kind of grating he has at the present time.

910. Never mind that. You have recommended a certain kind of grating that you think would be beneficial to millowners?—Yes.

911. What I ask is this; whether you have been at Mr. Webb's mill and know it, and what would be the effect of introducing that form of grating, which you recommend, at Mr. Webb's mill?—I do not think that it would decrease the power to the wheels at all, if it is put across the full width of the stream.

Mr. Pinkerton.

912. Have you any idea with regard to the cost of construction of the grating you would recommend in Mr. Webb's case?—They vary from 2s. to 10s. a square foot, that is the type of grating I put in.

913. Mr. Webb gave evidence that it would cost 1,400*l.* in his case?—I have not the least doubt it would, including masonry and timber work. I am only speaking of the iron work, and the cross of bars that I recommend; these vary from 2s. to 10s. a square foot.

914. Have you been to Mr. Webb's place?—Yes, some few years ago.

915. Would you think 1,400*l.* too high an estimate for the cost of erecting these safeguards?—There would have to be a good deal of money expended in preparing a foundation, because the water would have to be dammed off.

916. It seems a very simple thing to suggest a remedy, but if the millowners are compelled to carry out your suggestion it would cease to be a simple matter, would it not?—I must say I cannot answer you exactly on the point you are putting to me, because in all the cases I have had to deal with in putting in this rubbish rack, it has been at the time the turbine has been put in, and they have been put in front of the wheel, and rather close to it.

917. Your suggestion of a rubbish rack is for the purpose of protecting the turbine, I understand?—Yes.

918. Do you not think the salmon fry require protection?—I have never taken that into consideration.

919. But your evidence was to the effect that you never saw fry injured?—Just so.

920. And from that point of view, you must consider it perfectly unnecessary to erect safeguards for the fry, must you not?—Quite so. It has been only during the last two years that this point has cropped up, I think.

921. A question was asked you with regard to the steadiness of drive. Is the turbine equal, in your opinion, to steam?—I think water is steadier, because the speed of the engine will sometimes increase and decrease according to the pressure of steam in the boiler.

922. Then, if the Conservators in Ireland have their own way, Ireland is to be practically deprived of the benefit of water power?—Yes.

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Mr. MAXWELL GAULT, called in; and Examined.

Mr. Mocartyay.

923. ARE you one of the owners of the Phoenix Weaving Factory?—Yes.

924. Which is situate on the River Braide, a tributary of the Main, is it not?—Yes.

925. How many turbines have you?—One.

926. What is the horse-power developed?—About 20 horse-power.

927. How many hands do you employ?—Inside the works about 150.

928. You were prosecuted, I think, in 1889?—Yes.

929. At the petty sessions?—Yes.

930. And at the quarter sessions?—Yes.

931. And the case was carried to the Queen's Bench, was it not?—Yes.

932. What were you called upon to erect?—I was called upon to erect gratings at the head and tail race, and also to put on the netting in front of the turbine.

933. Was it a netting similar to the one produced?—Yes, just the same. It was a three-cighine netting.

934. How long was this netting on?—I think altogether a portion of a day.

935. What was the result of that?—The result was we had to take it out, because it interfered so much with the working of the mills that we could not have it there.

936. Has it never been on since permanently?—No.

937. You got an exemption, I believe, for the gratings of the head and tail race?—The grating at the head race we never put on at all, simply because our race is so long that we could not possibly keep a man there all the time to keep it clear, which would have been necessitated if we had. We had it on at the tail race, and suffer very serious damage from it, and Mr. Hornsby visited the place one day and gave us an exemption.

938. What was the nature of that damage?—It tore up the bed of the race underneath the sill, and also burst out the sides of the race.

Mr. T. W. Russell.

939. Who is Mr. Hornsby?—He is one of the Inspectors of Fisheries.

Mr. Mocartyay.

940. Did he give you an exemption for the tail race?—Yes.

941. But with regard to the head race you have not complied with the order, have you?—We have not.

942. And you have not complied with the order as regards the wire netting, have you?—We did comply with it; but we found it impracticable to work, and we abandoned it.

943. In fact, what would be the effect of compliance with these orders?—It would render our water power useless entirely. I have the Government survey map, and can show you the position of our race if you wish.

944. Please do so (the Witness explained the map to the Committee).

Mr. T. W. Russell.

945. How long is your race?—It is almost three-quarters of a mile, and all above here is plantation, and the leaves coming in here would simply block this up entirely, and necessitate us having a man here day and night. What we do at night, when the turbine is not working, is this; we have a bye-wash just here. That is where we have a grating in front of our turbine. Our sluices for admitting the water down to the turbine are here, and that is the overflow or bye-wash, and we simply put down those gates at night, and lift those, and anything that is in here gets a free flow down this bye-wash. This is the point at which we put the grating for which Mr. Hornsby gave us exemption. To show that any obstruction here is really a detriment to the power of the wheels, I may say that our neighbouring manufacturer constructed a weir down in the bed of the river here. We notified him to have it removed, which he refused to do, and we had to go to law with him. The case was tried, and lasted three days at the assizes in Belfast; there were three counsel and three engineers on each side, and the verdict of a special view jury was that this was very detrimental to the working of our wheels, and its removal was ordered.

Mr. Sten-Kerr.

946. That obstruction was a dam I understand?—Yes, for the purpose of catching water to flow into their works, and it had the effect of choking back the water here on our turbine.

Mr. Tambour.

947. Then the water did not get clear of the turbine, did it?—No, it did not.

Mr. Sten-Kerr.

948. Are you suggesting that a grating at the foot of the tail race would have the same effect as that?—Quite that. I think on the day Mr. Hornsby was there he saw the weeds and debris that came down the byewash, and it was blocked up to such an extent that the water was 27 inches higher in front of the grating than it was behind it. In the early part of the year on this river the farmers, when they are weeding their fields, throw all the weeds into the river as being the most convenient place. You will see it would not be practicable to send a man all up here to clear it, and, therefore, we never complied with the order as regards that.

Mr. T. W. Russell.

949. And you have not complied with the law as regards the head race, have you?—No.

Mr. Mocartyay.

950. I believe, as in most other businesses, competition is pretty severe with you?—Yes, it is very severe.

951. And the turbines, I think, you consider a very material factor in your works?—Certainly. The water power is an all-important thing, in

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Mr. GAULT.

[Continued.]

Mr. Morarty—continued.

fact, for the industries of Ireland, seeing that we are not so favourably situated with regard to the supply of fuel as the sister kingdom. The expense of coals to many of the present mills would make it practically impossible to work them if their water power is destroyed.

932. I believe the use of the turbine has largely developed lately, has it not?—Yes.

933. With regard to injury to fish, have you ever seen any fish injured?—Never.

934. Have you ever known them go through the turbine or not?—I do not believe they do, because I have often watched them before we put a shed over the front of our race leading to the turbine. I have seen the small fish playing in the race there, but when they come down near the grating they simply turn back again, so I believe, if any come down in our case, they pass through the bye-wash, which is running from 6 o'clock at night till 6 o'clock in the morning.

Mr. Seton-Karr.

935. All that time is your bye-wash open?—Yes, it is always open during the night.

Mr. Tomlinson.

936. What is the name of the river on which your works are?—The Braide.

937. What is the village or town which appears on that plan?—Ballymena; that is where our works are located.

938. Is the river pure opposite your works?—Yes, comparatively speaking, except during floods.

939. Is there much sewage that goes into it from Ballymena?—It is not supposed to go in.

940. Are you acquainted with the habits of salmon?—Slightly; I have always been in the habit of fishing since I was a boy.

941. Is there any practical difficulty in the salmon coming up the main stream of the river?—Not when they have a sufficient supply of water; but now, even so far as my memory goes back, the river is completely changed. I remember, when a boy, even in the middle of a dry summer you would have had to take off your boots to get across the river, but now, even in the winter, you can walk across dry shod sometimes.

942. What is the cause of that, do you think?—I attribute it entirely to the improved system of drainage.

943. Is there, in your experience, a diminution of the salmon in the river?—I believe there is.

944. Do you attribute it principally to that cause?—Yes, for this reason; when the water falls away so rapidly, any fish that get into those little holes, as they commonly call them, cannot get back, and even children, or anyone, can destroy them in those little holes.

945. And they do destroy them?—Very often they do.

946. Do you think the river is in too foul a state to allow of salmon easily coming up?—No, it is not foul; it is from the want of water that they cannot get up, and when they do get up the water falls so rapidly that any that are up are destroyed.

947. What is the height of the dam above your intake?—I really could not say, but it is 0.50,

Mr. Tomlinson—continued.

exactly in accordance with the Act of Parliament, whatever that is.

948. Is there a salmon ladder in it?—No.

949. Do you think a salmon ladder would be an advantage in it?—So far as I know, they can get over perfectly easy.

Mr. Seton-Karr.

970. How much of the flow of the River Braide does your mill take?—It takes all that comes down; we utilise all that comes down unless during floods.

971. Practically, unless there is a flood then, you take nearly the whole of the flow of the river?—Quite so.

972. Do you take the whole flow?—Yes, all that comes down our side of the river. There is another race taken out of the Braide river farther up than ours; we only get a portion of it, and then there is a burn which supplements that supply which comes into our weir.

973. Then you take the whole of the flow of the river as practically existing at the head of your mill race, do you?—Yes, unless during a flood.

974. You spoke of this bye-wash which was opened at night; is it open in the daytime at any time?—Yes, at breakfast-time and dinner-time.

975. For how long?—For three-quarters of an hour each time.

976. Are there any other mills which you know of which have a bye-wash in the same way, and opened at the same times?—No, I cannot speak from personal knowledge.

977. Do you know Mr. Webb's mills?—I know where they are located, but I have never been in them.

978. What other mills are there close to you on the Braide?—There is the Leighismohr Bleach Works, which get a portion of the water.

979. Are they the same kind of mills as yours?—No.

980. Have they turbines?—They have I believe.

981. Have they a bye-wash?—They have.

982. Do they keep it opened in the same way?—The place is not working at present.

983. Supposing that bye-wash did not exist at your works, do you think it would be more dangerous for the salmon and fry that come down into your mill-race and up your tail-race?—I do not think it would, because our race flows very slowly. We have not a great fall.

984. At all events you give an opportunity to any fry that happen to be in your race, during the whole of the night, for three-quarters of an hour at breakfast, for three-quarters of an hour at dinner, to go down free from any obstruction?—Yes.

985. How long at any one time was your mill stopped on account of the existence of this lattice?—It was not more than half-an-hour I should say, because we took the lattice out at once when we found the machinery slowing. We could not allow it to go down, because from the particular nature of our machinery, if the proper speed is not kept up, it means simply smashing out the yarn in the looms. The shuttles get caught in passing and repassing, and smash the yarn out entirely.

986. Then, to all intents and purposes, your

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MR. GAULT.

[Continued.]

Mr. Seton-Karr—continued.

will has never been stopped by this lattice, has it?—No, for the simple reason we did not continue its use.

987. You did not allow it to be?—No. If it had not interfered with us we would have allowed it to remain; but it got clogged up to that extent the short time it was in, that we had to remove it.

988. Do you know of any mills within your own knowledge that have stopped work on account of these lattices?—I know from the evidence given here, and with which I was very well acquainted before.

989. I want your own knowledge?—I have no personal knowledge.

990. Have you ever heard of any being stopped?—I have heard of them, but do not know personally.

991. What have you heard of?—Greenfield, for instance, Mr. Arthur's place, and Mr. Dismore's.

992. They were never stopped any longer than yours, were they?—I do not know for what length of time they were stopped.

993. Have you ever known fish to be killed in your works?—I have never seen one, although I have examined the race repeatedly.

994. Have you ever known salmon to be taken out of your tail race that have ascended from the river?—I have never seen one in it, and I have looked often and often for them myself.

995. Did you obtain exemption from the grating on the tail race?—Yes.

996. Would you object to put up any kind of grating there to prevent salmon getting in?—I do not think it would be necessary to erect anything of the kind, because the water in our tail race is never low; it is running constantly; it is not like a tail race that is left dry at times, because if the water is not coming directly through our wheel it is passing right in the front and down the bye-wash, so that in our case the grating would be an obstruction, and no benefit at all in my opinion to the fish.

997. As you have a regular flow of water down your mill race, I suppose you are fisherman enough to know that salmon would be much more likely to go up the tail race?—But our tail race is short, and they could only go a very short distance, and then they would be blocked. From the outlet of our tail race into the river, it does not go directly against the stream of the river. It goes on an angle, so to speak, down the side of the river, and consequently there is not so great an impediment to the fish to be caught by the stream, going out from our tail race.

998. Is there any kind of grating which you would allow to be put up at the foot of your tail race to prevent salmon ascending it?—There could be no grating put up that we could assent to, because of the weed coming down. It would block up that grating.

999. You insist then on having your tail race quite open and free, do you?—Quite free.

1000. Would no kind of grating satisfy you?—None. I do not believe it would be any benefit at all, even supposing that it were erected, so far as the preservation of the fish is concerned.

Mr. Seton-Karr—continued.

1001. What kind of turbine is yours?—It is on the Leffel principle.

1002. You have heard the evidence of some of the other witnesses, have you not?—Yes.

1003. It does not differ in any respect from the turbines we have been talking about, does it?—No, not very materially.

1004. Do you think fish could pass through your turbine without being injured?—I have never seen any. I could not tell, but I have never seen any fish killed.

1005. What kind of grating have you in front of your turbines now?—It is fully $\frac{3}{4}$ of an inch. It is a barred grating with $\frac{3}{4}$ of an inch apertures.

1006. Have you any difficulty in keeping that clean?—We have.

1007. Still it does not affect the working of your machinery, does it?—The mao is quite at hand, and it can be conveniently cleaned. Any débris, or anything taken out, is emptied down the bye wash, so it is simply taken out of one place and put into another.

1008. Have you ever seen any salmon fry close to your grating?—Yes, I believe I have seen fry within a few feet of that grating.

1009. But I gather you do not believe they ever pass through?—I do not believe they ever pass through.

1010. How long ago did you receive a notice from the local inspector calling on you to put up gradings, before you were prosecuted?—It must have been months; I could not exactly specify the time; we stuck out against it as long as we could, because we had a pretty good idea of what damage it would do to us.

1011. How long was it?—I should say it was two or three months.

1012. I want to ask you a question or two about this Bill. Have you read this Bill brought in by Mr. Macartney?—Not altogether fully. I have read the greater portion of it.

1013. Do you, as a millowner, desire to have it passed in its present form?—Yes, I believe it is to the advantage of the country.

1014. Of course it affects your interests very directly. I want to know if you have read it carefully over?—I have read, I may say, the greater portion of it carefully.

1015. You will observe under Clause 4 that the "Board of Conservators, after due notice to the owner or occupier of any mill or other premises, at the expense of such board, during such period as may be prescribed in each year, may order to be placed in any water course, mill race, oot sluice, or other channel for conveying water for any purpose from any river frequented by salmon at or near the point of divergence from and return to such river, or either of them, or in any other suitable place, a grating of such form and dimensions as they shall determine: Provided always, that nothing herein contained shall affect the liability of any person to place and maintain a grating or gradings across any artificial channel under the provisions of the 76th section of the Act 5 & 6 Vict. c. 106, nor shall authorise any grating to be placed so as to obstruct any channel used for navigation, or in any way interfere with the effective working of any

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[Continued.]

Mr. Sivas-Karr—continued.

any mill." Now taking your own case, who should you think would be the proper judge of whether those gratings interfered or not with the working of your mill?—Any independent party who is acquainted with the trade would be capable of judging.

1016. What would be the proper tribunal to judge whether those gratings interfered with the working of these mills or not; would you be satisfied with the fishery inspectors?—Well, I suppose some of them might look on us favourably, and be unbiased, and others not.

1017. Would you be prepared to trust your interests to the fishery inspectors?—I would not.

1018. Then what tribunal would you want; that clause provides that there should be some tribunal to which this question should be referred, and I want to know if you have formed an opinion as to what would be a fit tribunal to judge whether the gratings would interfere with your flow of water or not?—I should say some party acquainted with the nature of the industries carried on.

1019. In other words, you would like to see a question of that kind referred to arbitration?—I suppose it would amount to that.

1020. Then you would not consent to the fishery inspectors being the tribunal or the judge?—Certainly not, because I think it would be a biased opinion. On the same principle, if it was left to ourselves, we would like to have the best of it.

1021. Supposing that the Board of Conservators put up or wished to put up a certain grating, would you undertake to clear that grating yourselves?—No, I do not think we ought to do so.

1022. Do you think the Board of Conservators should provide a man to keep it clear?—Certainly, if it is to their benefit and advantage to have those gratings erected. If they consider it is for the advantage and protection of the fish, they are reaping a benefit from that protection, and I do not see why the millowner, who is deriving no benefit, should be compelled to go to any trouble or expense in the matter.

1023. At the same time you recognise the fact, I suppose, that the fishery owners have vested rights that have always existed?—I cannot see that. I question their rights.

1024. You are not prepared to admit that?—No, I am not; I think we all ought to be allowed to take the fish when we can get it.

1025. You think you all ought to be allowed to take the fish when you can get it, do you?—Yes.

1026. But supposing that certain precautions were necessary, in order to prevent your machinery from injuring the fish, do you think the millowner should, or should not, bear any of the proportion of the expense?—No, seeing he is deriving no benefit from it. All the grating that is required for the protection of his property is invariably erected in front of the turbine, and anything extra to that which the fishery inspectors might require, I think the expense of erecting and keeping clear ought to be borne by the fishery owners, as they derive the benefit.

1027. I suppose, as long as the flow of your

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Mr. Sivas-Karr—continued.

water is not interfered with, you are prepared to give the fishery owners all facilities?—Quite so, so long as they do not interfere with us.

1028. But I understand you to say, the facilities you would give will not extend to paying any part of the cost?—I do not think we should be asked to do so.

1029. You think they should bear the whole cost of any gratings required to protect their interest, do you?—I do.

1030. Do you happen to know the Zion Mills?—I know where they are located, and do a large business with them, but I do not know the workings of their place at all.

Mr. Pinkerton.

1031. You are from Ballymena, are you?—Yes.

1032. And you say, do you not, you have never complied with the law in this case?—Not so far as the head race is concerned. We did comply with the law with regard to the lattice, or netting, and the grating at the tail race.

1033. Is it your opinion that you are justified in breaking it?—Yes.

1034. Supposing that happened in the south of Ireland, what would be your opinion of that kind of action?—It would be the same.

1035. Do you represent the party of law and order down there?—I would like to do so.

1036. You also hold the opinion, do you, that you have a perfect right to take the salmon when opportunity offers?—Yes, in a legitimate way.

1037. What do you term a legitimate way?—By fishing. I would not go in for poisoning or destroying salmon, or fish of any description, wholesale. I would go in for killing a salmon with a fly, or the like of that. When I had time, I always took out a license for fishing, but I have not had that pleasure for some time.

1038. Do you hold the same opinion as the other witnesses, that the decrease in the number of salmon is largely owing to the increased drainage?—Yes; and there is another reason as well. I myself have witnessed the operations with the pollen net, and I have seen cartloads of salmon fry thrown out on the bank to rot.

1039. Is poaching common in your district?—I dare say there is some done, but not so much as there used to be.

1040. I suppose, as far as the millowners are concerned, they are anxious to prevent poaching?—Quite so; in fact, I know several places where a man imperils his situation if he is known to touch a fish.

1041. If water bailiffs paid as much attention to poachers as they did to these gratings, do you think it would be decreased?—You require a lot to watch poachers; they are hard to watch.

1042. It is your opinion that, as you derive no benefit from these gratings, it would be an unjust thing to ask you to erect them, I understand?—Quite so.

Chairman.

1043. You had the water obstructed by your neighbour below your mill, you said?—Yes.

1044. What did he interfere with?—He interfered with the working of the turbine.

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1045. He

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Mr. GAULT.

[Continued.]

Chairman—continued.

1045. He interfered with your vested rights in the water, did he not?—Yes.

1046. Can you define the difference between your vested rights in the water and the fishery owners' rights in the water; what is the difference between your rights in the water, which you went to law about, and the fishery owners' rights?—I suppose the fishery owners' rights, if they have any, are the protection of the fish, and ours are the protection of our machinery.

1047. Can you say there is any difference between protecting the machinery and protecting the fish; they are both the same; they are property, are they not?—But the one is created by our capital, and I do not know if the fishery owners have the same amount of capital invested or not.

1048. You think it is a question of degrees of capital invested?—To a certain extent it is.

Mr. Macartney.

1049. You come here as a millowner, do you not?—Yes.

1050. Not as a lawyer, and you are not prepared, are you, to give legal opinions as to vested rights?—No.

1051. After all, your rights in the water are local rights, are they not?—Yes.

1052. For instance, you have no rights at Coleraine, have you?—None whatever. As far as I know, with regard to our rights, we can prevent any erection being made which would interfere with the free flow of our water.

1053. They are strictly defined by law, are they?—Yes.

1054. With regard to the tribunal, you were satisfied with your tribunal to which you referred your dispute with the millowner below you, were you not?—Yes.

1055. Would you be equally satisfied with a similar tribunal in this case?—Yes.

Chairman.

1056. Are you satisfied with the courts of law, that is the point. You have been to them, and you are not satisfied?—I am perfectly satisfied.

1057. I meant on the fishery question?—No, I am not satisfied with the law as it exists at present, for the simple reason that we are deliberately breaking the law now, and we ought to have a law which we could not be compelled to break.

Mr. Seton-Karr.

1058. You said just now that you thought every man should have a right to take fish whenever he liked, but, of course, you recognised, I suppose, that the fishing industry affords a very valuable food supply to the country?—Certainly.

Mr. Seton-Karr—continued.

1059. Then it is to your interest, is it not, that the fish should be preserved?—I never went in for destroying them.

1060. Quite so; you want to preserve them?—Yes, quite so.

1061. I ask you, as a millowner, if you recognise that when you are taking the flow of water from the river it does not entitle you in any way to destroy the animal life in that river?—Certainly not.

1062. Supposing your machinery entails a certain amount of expense in order to protect an animal life, which is a food supply, and is a subject of vested interest; I ask you, as a millowner, do you not think it fair you should bear some portion of the expenses?—I do not think it is, so far as we are concerned, because my position is this: that we do not injure the fish as our machinery at present stands.

1063. That is not the question. I want to know your attitude on this point. Suppose that money is required to be expended for safeguards for the fish, do you or do you not admit that it will be fair for you as millowners to bear some portion of that expense?—I do not think it would be fair.

1064. Then I want to know exactly what your attitude is on that question?—I say it would not be fair for us to have to bear any expense.

Mr. Frederick.

1065. You do not admit injury to the fry, do you?—No, I have never seen it.

1066. And therefore you do not believe there is any necessity for safeguards?—Not so far as my personal knowledge extends.

1067. I suppose the only safeguard required is to prevent the salmon going up your mill race, and coming in contact with a person who has liberal views with regard to salmon?—We have been working this place for upwards of 18 years, and during the greater portion of that time I have, after that bye-wash has run all night, been there every morning at 6 o'clock or shortly after, when the place was drawn on, and I have never seen a salmon in the race yet, although I have often heard of them being there prior to our getting this mill.

Mr. Tomlinson.

1068. Then your theory is that your machinery tends to keep them out of the race?—I do not know whether they ever are there, but I heard of them being there before we bought the premises.

1069. What use was made of the water before you were there; was there a water wheel there?—Yes, there was a water wheel.

Mr. WILLIAM GIBSON, called in; and Examined.

Mr. Macartney.

1070. Your place of business is at Lisnaffillan, I believe?—Yes.

1071. On what river is it?—The Main.

1072. How many hands do you employ there?—About 200.

1073. You have one turbine, I think?—We

Mr. Macartney—continued.

have one turbine, three water wheels, and three steam-engines.

1074. The turbine there is the one which we have heard a great deal about, is it not?—Yes, the McAdam.

1075. Will you tell the Committee the nature of

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Mr. GIBSON.

[Continued.]

Mr. Macartney—continued.

of the business you carry on?—Blanching, dyeing, and finishing.

1076. We have heard a great deal about this turbine and the grating in front of it; will you tell the Committee what has been the result of that as far as your work is concerned?—The turbine is one of McAlam's, and it has worked first rate, but there are inconveniences connected with it. Owing to the shield it is liable to be stopped up by gross and leaves, and another defect is now in the improvement in these turbine wheels. They are made without the shield, and the shield lessens the water power as scientific men tell us.

1077. When you clean the shield does it entail any stoppage of the works?—Yes.

1078. Have you to clean it frequently?—Yes, at different times of the year, and we have to keep men cleaning it, but that fails when a great quantity of stuff comes down, and then we have to stop. But, of course, the shield being partially closed, makes the drive unequal. That does not in itself become so apparent with us as with a textile manufactory, but it does practically, because it retards our work and causes irregularity in our goods. In our case it is not quite so perceptible; it would not break threads and that kind of thing; but it has seriously the same result.

1079. I believe you propose to erect another turbine?—Yes.

1080. But of a different character?—Yes.

1081. Not similar to this one?—No, owing to the defects I have mentioned.

1082. Your experience of this one and the shield grating in front of it would not encourage you to erect another one of a similar character, would it?—Yes, that combined with the improvement in turbines.

1083. Having had considerable experience with regard to the manufacturing processes carried on in this district, do you think the turbine of great importance to the trade?—Undoubtedly.

1084. For the purpose of getting the fullest possible development out of the water power?—Yes, and there is another advantage we find here. It is a more equal drive, and we can drive it in harmony with steam engines, which is a great matter. We have it so constructed that we can use all the water power with the turbine, and it runs in harmony with the steam engine, and is a great advantage.

1085. Is that peculiar with the turbine?—I believe so.

1086. At all events, you do not use your other water wheels in the same manner?—No, we were never advised to work them in conjunction with it.

1087. With regard to injury to fish have you ever noticed any yourself?—Never, and we have several times opportunities of judging. When we stop all the place to clean our race, once or twice a year as the case may be, and I never heard of a mutilated or a dead fish in or about our works.

1088. Have you ever been prosecuted?—I believe we were in some kind of way combined with the others in the matter, but we had complied with all the requests, and I think our being prosecuted was some mistake. We did what

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Mr. Macartney—continued.

they wanted us to do. When Sir Thomas Brady and Mr. Hornby came down we put up what they asked us. We put up one at the head sluice and pointed out the drawback it was, and they gave us exemption, but we retained grating at the lower part.

1089. Are you satisfied with the law as it stands at the present moment?—No.

1090. You desire to see an alteration?—Certainly.

Mr. TOWNSEND.

1091. Can you drive your turbine in conjunction with your steam engine?—Yes, we do.

1092. Would your present turbine stop fish with the appliances you have?—Do you mean the shield?

1093. Yes. The shield would stop the fry coming down the mill race; would it stop them going up?—Then you see we have the thing at the tail race to prevent them coming up.

1094. What sort of thing is that?—It is longitudinal, sloping, with bars. That we retain, though at great inconvenience. We never made any representation about it, but owing to the increased backwater, and arising out of that backwater, since we put that up, we have received damage in this way: We have three water wheels, and when one of them is stopped at any time that lessens the water coming through, and, of course, the other wheels that have been working in backwater go with extra rapidity and smash our machinery.

1095. What sort of wheels have you?—Three bucket wheels.

1096. Are they breast wheels?—Yes. And all the time we have to drive these through increased backwater caused by this protection below, and then, as I said before, when one of these wheels is stopped, it lessens the water going through, the wheels fly round with rapidity, and within the last six months we have had to pay 60 £ or 70 £ for smashes, besides the constant wear and tear and increased expenditure, through keeping our wheels in order, which we were not subject to before we put this up.

1097. Supposing you put up a modern turbine, as you say you propose to do, will that do away with the water wheels?—It will do away with one of the water wheels. We propose putting up a turbine wheel and doing away with one of the water wheels, and putting more machinery.

1098. Supposing you put up the turbine, you desire to take away the grating at the tail of the mill race, do you not?—Yes, certainly.

1099. Would that be a necessary condition?—It would still increase our backwater.

1100. Would that backwater be more injurious to the new turbine you propose to put up, than it is to the existing turbine?—I am not competent to answer that, but the one advantage in the turbine wheel compared with the bucket wheels we have, is that it can go through backwater that they will not go through.

1101. You spoke of having an exemption, what was the exemption from?—From putting the protective iron bars at the head race. We had dispensed our race and put up some new machinery, and put in an extra sluice gate, and

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Mr. GIBSON.

[Continued.]

Mr. Toolhouse—continued.

we found that when we put this iron grating up the superficial area of it just made up the additional sluice thereby introduced to start with, thus counteracting all the expense we had gone to, and the extra machinery (which was about 400*l.* or 500*l.*), and they granted us the exemption at once.

1102. Then, in fact, you have no gisting in the head race now?—None.

1103. Have you ever noticed any salmon fry in the head race?—No, I have not.

1104. Have you watched for them?—No. The only time I ever watched for fish at all was when the whole place was stopped. I have often watched to see if there were any trout in the river; the little boys come about to have fishing, but I am not a fisherman myself.

1105. What is the result of your watching?—The result of my watching and the result of my inquiry is, that I have never heard of a mutilated fish. There are lots of trout there.

1106. How near do the trout go to the turbines?—This is when the water is run off; only when the water is run off for cleaning purposes.

Mr. Selous-Kerr.

1107. How much of the flow of the river do you take?—When it is low we take it all.

1108. Have you a very large turbine?—The turbine is nominally 75 horse-power.

1109. Comparatively speaking, is that a large turbine?—I have not much experience in turbines; I never saw any but our own, that is a large turbine.

1110. I think you have told us that you have permanently fixed a perforated iron plate in front of your turbine?—Yes.

1111. How long have you had that plate there?—From its erection. It is part and parcel of McAdam's turbine.

1112. No salmon fry or fish can possibly get through that plate, can they?—I think not; the openings are five-eighths of an inch.

1113. That, I take it, is one very efficient reason why no fish could possibly be injured in your turbine, is it not?—Yes; but it is an inconvenient thing, as I have explained.

1114. You have told us that you say it is on account of the cleaning. Why did you put it up originally?—It has been up a long time. Three other turbines were not in vogue at the time. It has been up nearly 30 years.

1115. What has this perforated iron plate?—The whole thing. It is 25 years old I am sure. It was put up at the time the wheel was put there. It is part and parcel of McAdam's turbine.

1116. How long have you had it up?—From the very first, 25 years.

1117. Then I understand you to say that this perforated iron plate of which you complain, you have had up for 25 years?—Yes.

1118. And you still has been working all that time, has it?—Exactly; at a comparative inconvenience with what we can do now.

1119. But that is the fact, is it not?—That is the fact.

1120. And your mill is working still?—It is.

1121. Satisfactorily to yourselves?—Of course,

Mr. Selous-Kerr—continued.

if we are putting up other machinery, we should like to put up the newest style, and machinery which can be worked at the least expense, and we would not adopt the present form in consequence of the drawbacks I told you of.

1122. But this new turbine you will not put up and work with your present flow of water, will you?—We would not put up McAdam's turbine again.

1123. What style of turbine would you put up?—We have an estimate from Mr. Caille now, and we have others, but I forget what the other names are; Lefell is one.

1124. But that turbine would also be protected by this same iron plate, would it not?—Oh! no.

1125. What kind of protection would you have?—Protection with the bars two inches apart as was explained to-day.

1126. Why would you object to put up a perforated iron plate in front of your new turbine?—Because of the loss of power and the difficulty with the weeds and grasses, and its clogging up.

1127. Do you think that you, as a millowner, are justified in putting up any kind of wheel you like, whether its erection will injure the fishing interests or not?—The injury is a disputed point.

1128. I am not asking you that; but assuming that injury is hedged by any particular kind of wheel?—I am a very prejudiced opinion on that point.

1129. I want your opinion?—I think, taking all the bearings of the case, we should not be at any expense.

1130. That is not my question: do you think that you are justified, as a millowner, in putting up any kind of turbine wheel you like, regardless of the fact that it may injure the fish and fishing?—Certainly, we are not justified in doing it if it is illegal.

1131. I will put it in this way; supposing a certain kind of wheel destroys fish, do you think, as a millowner, you are justified in putting that wheel up regardless of that fact; I only want to know your opinion?—The only furor I can answer that in is, if any law says, "do not put it up," I think we would be wrong to do it; I think if there was no law on the question, naturally, we would have a perfect right to do it.

1132. I want your attitude on the general question?—Do you mean as a friendly neighbourly thing?

1133. Yes, exactly. I will put the question in another way; are you prepared to meet the fishery owners in any way in protecting their interests?—No, not with a decrease of water power; I cannot say I am prepared to meet them.

1134. Supposing that safeguards are required in order to protect the fishing industry, are you prepared, as a millowner, to bear any of the expenses?—I am not prepared to do so.

1135. Can you give any reason for your attitude?—One reason would be a selfish reason, namely, that it would be taking money out of my own pocket; and another reason would be that I think the interests involved in our business, and the amount of money in it, are of such paramount interest compared with the destruction of fish,

fish,

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Mr. GIBON.

[Continued.]

Mr. Seton-Karr—continued.

fish, that I do not think it would be fair. The interests of the fishing and bleaching trade is of so much more importance than the fishing, that I do not think we would be prepared to bear any expense.

1136. I suppose you would not think it fair if the fishery owners, in looking after their own interests, should inflict any injury on your interests. Do you think the mill-owning interest is of paramount importance?—Yes.

1137. And do you think the fishing industry cannot compare with yours in importance?—Exactly so. Perhaps that is a selfish view, but that is the view I take.

1138. Supposing that this Bill was passed, and supposing that the Board of Conservators put up under that Bill a certain kind of grating, who, in your opinion, would be the proper judges as to whether that grating was injuring your flow of water?—I should think that we would be the better judges by experience.

1139. But then you admit you are prejudiced, are you not?—I cannot help being prejudiced.

1140. Do you think the fishery inspectors would be fair judges?—I assume they are alive to the same defect.

1141. Do you think they are prejudiced?—Yes, I should think so. They are human.

1142. So you would not be satisfied that the fishery inspectors should be the judges of whether the grating was an injury?—No, I would not be satisfied with them.

1143. Mr. Macartney asked you whether you were satisfied with the present law, and you said you were not. I wish you would kindly give the Committee a little more explanation on that point. Why are you not satisfied with the present law?—Because the present law would make us subject to such an infliction, in this way, that it would practically stop our trade.

1144. It has not stopped it yet, has it?—No, because they granted us an exemption; but the law is there still.

1145. Is it not the fact that millowners have always had an exemption whenever they have had reason to ask for one?—We have had a partial exemption, but we are suffering still from what we retain, namely, the grating at the lower end; the other grating would have practically stopped our works altogether.

1146. But your works never have been stopped, have they?—No, they have not. But then they would be subject to being stopped if the law was enforced in its entirety, and that is what, I think, is the hardship. It must be discretionary with Sir Thomas Brady and Mr. Horusby whether we should have to work under them or not. We obeyed their instructions, and they granted us an exemption.

1147. They did give you the exemption?—The did at once; but we never applied for exemption for the lower part.

1148. Why not?—It took us some time to find out the hardship of it. The other was self-evident at once.

1149. You have never had reason to complain of their conduct in refusing you exemption when you thought you ought to have it, have you?—No. It was only from day to day that we have

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Mr. Seton-Karr—continued.

been discovering the hardship of the grating at the lower part.

1150. And yet you have been going for 25 years, you say?—No, it is since this was put on during the last year.

1151. Since what was put on?—Since we put on the wire netting below.

1152. Are you speaking of the netting at the foot of the tail-race?—Yes.

1153. But you have an exemption as regards that, have you not?—No, we have not; we never applied for it. We got exemption for the top, but not for the bottom.

1154. Have you that netting at the foot of the tail-race at the present moment?—It was taken off the other day because it was the proper season to take it off by the fishery laws.

1155. Your mill has never been interfered with by that, has it?—Yes, I told you just now it has increased the back water.

1156. But your mill has not been stopped on account of that?—No, it has not been stopped, but it has smashed our mills. It increased the backwater; our wheels have been consequently driving through this backwater at an increased annual expense, and when we shut off one of our wheels that lessens the backwater. Then the other wheels that were labouring through the backwater revolved with increased rapidly and caused these launches. We have had 50 £ to 60 £ worth of breakages within the last six months which we never had before.

1157. You told the Committee just now that the mill has never been stopped?—No, it never was.

1158. Now you tell them it was smashed?—There were breaks in the machinery.

1159. How long did it take you to repair it?—It broke the part of the machinery that drove what we call the wipers that make the wash mill feet revolve.

1160. I want to know what effect that grating has had on the working of your mill?—That is the effect.

1161. I want to know how long it took you to repair that, and how long you had to stop for the repairs?—It only stopped a portion of the mill. We were about 50 £ out of pocket in repairing it, and the wheelwright says that the expense in consequence of our wheels being driven through the backwater is a constant expense. Our whole place was not stopped; it was a partial break.

1162. It was not a very serious affair?—No, 50 £ to 60 £ a half year is not very serious.

1163. Do you think that is the result of your not having cleaned the lattice or the gratings sufficiently. Could you have prevented the water coming back like that if you cleaned it?—We find it impossible to clean it.

1164. There is not much difficulty in cleaning bars, is there?—They are longitudinal, and when a man uses the grappling iron to scrape away the leaves it is practically impossible to do it. They are very hard to clean when they run across. When you put down the thing to pull up the weeds it catches in the bars.

1165. Is it anything like that picture?—These are bars put across the tail race of the river in a sloping position.

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1166. Do

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Mr. GIBON.

[Continued.]

Mr. Seton-Karr—continued.

1166. Do you see that picture of a sloping grating?—Yes; it is not at all like that.

1167. Would it not be very much easier to clean a grating of that kind than the one you described?—I suppose it would be easier; I should say it would be. Ours is very difficult to clean. I have not much experience in these gratings, and I have never seen any except those at our own place.

1168. Would you consent to have a grating of that kind at the foot of your tail-race, instead of the one you have now?—I am not competent to give an opinion upon that.

1169. You do not know enough to say?—I do not.

1170. Have you not got some waste sluices where you can let off the waste water?—Yes, what we call the bye wash.

1171. When do you open them?—When all our wheels are going they utilize all the water; it just depends on the state of the river and if we do not want all the water, and we stop one of the wheels we let it go down this back sluice.

1172. Could you not prevent the grating at the tail race from backing up your water by opening those sluices?—No, it is the quantity of water that goes through to drive our machinery and must consequently be in that race that makes it.

1173. Would the opening of the waste sluices have no effect on your tail race?—No, no effect at all.

Mr. O'Neill.

1174. You say you have had this wheel up about 25 years?—I think it must be something of that sort.

1175. And you never had any grating at the head or tail race until recently?—Yes.

1176. You were served with notice to put that up, I suppose?—We were.

1177. By whom?—By the conservators.

1178. And you at once complied?—At once.

1179. But you found that the one at the head of the tail race was so impossible that you got an exemption as to it?—Exactly.

1180. But you never asked for an exemption for the one below?—No.

1181. Because you did not know how much damage it would do?—Quite so; we are experiencing it daily.

1182. Are you going to ask for an exemption for it?—We thought we would see the result of this Bill first.

1183. You have said, I think, and you are quite certain, that you never heard of any damage being done to fish about your premises?—Never. I set my face against poaching of every kind and shape about our place. The manager has orders to dismiss a man if he poaches in any shape or form. During the last 15 years I have built a new house at our works, and there has been no poaching whatever as far as I know or can learn at our place.

Mr. Pinkerton.

1184. According to your statement, you have always been law-abiding?—Yes.

1185. And you obediently regard it. You say if you had erected a new kind of turbine you could not possibly comply with the law. Is

Mr. Pinkerton—continued.

it owing to the fact of this old-fashioned turbine that you are able to work with this perforated plate?—Yes; we are fortunate in that respect.

1186. And you hold the opinion that if you put up a new turbine you must have a free flow of water?—We want to have that if we can.

1187. The effect of the backwater has been to cause you increased wear-and-tear of machinery, I understand?—It has decidedly.

1188. Suppose any different method could be arranged at your tail-race, so as not to cause backwater, have you any objection to the Conservators putting it up at their own cost?—Certainly not.

1189. But, so far as you are concerned, no matter what new inventions may be made with regard to gratings, you have no intention of adopting them at your own cost?—Certainly not.

1190. Supposing the erection of this turbine will benefit thousands of men, and injure thousands of fish, which would you rather do?—I would rather benefit the men.

Chairman.

1191. Supposing there were two millowners on the same river, would you, as one millowner, think you were entitled to do something which would injuriously affect the other millwright?—Irrespective of law?

1192. Never mind about law. There are two millwrights on the same river; do you think one millwright has a right to do something which is to his advantage, but which would be prejudicial to the other millwright?—I hardly know how to answer that.

Mr. Macartney.

1193. If you did do anything that would injure the other millowners, he has at once the opportunity of going to courts of law, has he not?—Yes.

1194. And would bring you there at once?—Yes.

1195. And a judge would decide whether your action was legal or illegal?—Yes.

1196. And if it was illegal, you would have to cease?—Yes.

1197. And if it was legal you could go on?—Yes, that was what I tried to explain. When two people are in competition with each other, it is a question who is acting legally; and if I act illegally I can be stopped.

Mr. Seton-Karr.

1198. Would you think it unfair in the case which was put by a Member that if you, as a millowner, were putting up a wheel which would injure the fish, if you were asked to pay some portion of the expenses of safeguarding the fishing industry. Would you think it unfair if you were asked to share the expense of protecting the fish, seeing it is by putting up that kind of wheel that you are injuring the fish?—I do not think I should be asked to pay any of the expenses.

1199. Then you think it would be unfair if you were asked to pay any portion of the expenses of protecting the fish?—Yes.

1200. Even

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Mr. GIBSON.

[Continued.]

Mr. Seton-Karr—continued.

1200. Even though you were putting up a new kind of wheel which was admittedly injuring the fish?—Yes.

Chairman.

1201. I should like to repeat my question, because it is a very simple one, and if you cannot answer it all you have to say is that you cannot answer it. Suppose there are two millowners on the same river, and one wishes to do something which is prejudicial to the other, would you approve of it, without reference to any question

Chairman—continued.

of law?—Should I approve of one millowner doing anything that would injure the other?

1202. Exactly; you need not answer the question unless you like?—My own personal opinion is, that I would not like to do anything to injure any person if I could help. I would rather not do it.

1203. Then do you distinguish any difference between the millowners and the fishery owners?—I think there are two great principles involved here that clash. That is the only answer I can give.

Mr. ALEXANDER BASIL WILSON, re-called; and further Examined.

Mr. Macartney.

1204. Mr. Webb has stated before the Committee that he had an estimate prepared with regard to the requirements of the Board of Conservators at his place, as to lattices and gratings and wire nettings, and he said it would have cost 14,000 l. to have complied with their terms?—Yes.

1205. Were you employed to prepare the estimate?—I measured the ground, and prepared the estimate.

1206. And, in your opinion, would it cost 1,400 l.?—It would.

Chairman.

1207. Have you any specification or estimate here?—I have not got it with me.

1208. You are speaking from memory, then?—I know the gross figure. Of course that is irrespective of any question of the stoppage of the mill; it is purely engineering work in construction.

Tuesday, 29th March 1892.

MEMBERS PRESENT:

Mr. Cox.
Sir John Whittaker Ellis.
Mr. Hayden.
Mr. Macarty.
Mr. O'Neill.

Mr. Pinkerton.
Mr. T. W. Russell.
Mr. Seton-Karr.
Dr. Tanner.
Mr. Tomlinson.

Sir JOHN WHITTAKER ELLIS, BART., IN THE CHAIR.

Mr. STEWART JOHN ROBINSON, called in; and Examined.

Mr. Macarty.

1208. I BELIEVE you are carrying on business at Dromona Mills on the Malne, and at Killybegs Mills, are you not?—I carry on business on the Malne and on a tributary of the Malne.

1210. I believe you employ turbines?—Yes, I have four altogether.

1211. Do you carry on the bleaching and the liner and cotton finishing business?—Yes.

1212. Were you called upon to put up any gratings?—I was called upon last year to put up wire nettings. I got exemption from gratings, but not from wire nettings.

1213. Did you erect wire nettings?—I did.

1214. What was the result?—I could not drive the place one hour with them up.

1215. Did you apply for an exemption?—No. Sir Thomas Healy and another gentleman came round; I was not at home when they came, and I applied afterwards for an exemption for the gratings but not for the nettings.

1216. You got an exemption for the gratings, but not for the nettings, did you?—Yes, without asking.

1217. Were you called upon to put up gratings?—No, nettings; I believe I was called upon but I did not put up the gratings at all, but I put up a netting.

1218. Then afterwards Sir Thomas Healy came there; you were not at your mills, but you received an exemption for gratings which you had not put up, but you got no exemptions for nettings which you had put up; is that so?—Just so.

1219. What did you do with your nettings?—I threw them out.

1220. Were they anything like that one which has been produced in this room?—Exactly the same as that, or almost the same; they were on the same principle.

1221. In your opinion would it be possible to carry on your business and use your turbines if you were compelled to keep them up?—Impossible. It is absurd to ask such a thing.

1222. Do you consider turbines of great importance to your business?—I do.

Mr. Macarty—continued.

1223. Will you explain to the Committee why, as shortly as possible?—They give a steadier drive; they are more effective and of course use less water.

1224. What is the power developed by your turbines?—About 100-horse power. I should say I have four turbines and four breast wheels, and combined I get about 120-horse power.

1225. The introduction of the turbine, I believe, has considerably developed manufacturing processes?—Yes.

1226. With regard to injury to fish, have you ever seen any injury to fish?—None.

1227. Have you ever seen any instance of injury?—No single instance.

1228. Have you had your attention specially turned to that point?—I have.

1229. Have you caused inquiries to be made by your employés into it?—Yes, by my workmen and the foreman at the place who has charge of the turbines, and they never saw any dead fish about the place.

1230. If salmon fry get into the turbine, have you any belief one way or the other as to whether they would be injured?—They would not be injured at all.

1231. Have you made any experiments in that view?—I have.

1232. Will you explain to the Committee what they are?—On last Friday I passed these things through the turbines.

1233. What are they?—Slices of turnip.

1234. Those you say have been passed through one of your turbines?—Yes, and that is I may say the smallest turbine on the Malne river; it is a 33-inch turbine running at 150 revolutions per minute. These pieces of wood were also passed through, and not one of them were touched.

1235. What did you say your turbine ran at?—The turbine that these pieces went through runs at 150 revolutions per minute.

1236. It has been stated by other witnesses that there are causes to which the diminution of salmon might be attributed in the Malne; do you think there are any causes operating there

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Mr. ROBINSON.

[Continued.]

Mr. Mooney—continued.

these which would lead to that diminution?—There are a number of causes which are possible. I believe the Board of Fisheries will grant a license to an angler, for instance, for 1 l., and that angler will kill more fry than all the turbine wheels in the province of Ulster, or I might say all Ireland. Then there are poachers, of course.

1237. Do you think poaching goes on to any considerable extent?—I think it does.

1238. I suppose you are not satisfied with the law as it exists at the present time?—Certainly not.

1239. Do you consider it unfair to the mill-owners?—Quite unfair and unreasonable entirely, and impossible, too, to fulfil.

1240. In fact, in your view, it places your business as a disadvantage?—It would ruin my business and place altogether, and I can prove it, too, to anybody who wishes to come there.

1241. How many hands do you employ?—When the place is fully in work from 80 to 100, but at the present time a part of the place is under repair.

Mr. Haydon.

1242. Is not catching fry even by angling illegal?—No; it is catching the salmon that has gone up to spawn.

1243. Is not that illegal?—It is not if you get a license.

1244. Have there been any prosecutions for catching fry?—I do not mean fry, but salmon with fry. I mean when the salmon are in the act of going up to spawn, before they do spawn and are full of fry, they get caught.

1245. Is that during the salmon season?—Yes.

Mr. Tomlinson.

1246. By full of fry, do you mean preparing to go up and deposit the eggs?—Yes; the salmon goes up in the autumn, and you can catch thousands in the two months of August and September, and, I think, November. For 1 l. you can catch as many salmon as you choose.

1247. You do not mean they actually catch small salmon, do you?—No, but they catch the salmon who are in the act of going up to spawn their eggs.

Chairman.

1248. I take it that salmon fry is small fish, is it not, whereas now you are dealing with the salmon that are in spawn?—You must assume this; if I catch a salmon in the act of going up to spawn all the fry that the salmon may produce is lost.

Mr. Tomlinson.

1249. Have you found any difficulty in keeping your mill-race clear of obstruction?—Yes, I have.

1250. Do you have any grating at all in front of your turbine?—I have in front of all the turbines.

1251. Some of the witnesses have spoken of the American weed as being a cause of the diminution in salmon; do you agree with them?—Yes, I believe it is; my head-race is full of it, and we have to cut it once or twice a year.

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Mr. Nelson-Kerr.

1252. Has your mill ever been stopped for any length of time on account of the gratings or nettings?—It was stopped till I took it out.

1253. How often was that?—Once.

1254. For what period?—For about an hour, until I got the wires out.

1255. Your mill was stopped for an hour, you say?—Yes.

1256. And no more?—No, that was all.

1257. Was it ever stopped at any other time?—No, because the wire netting was taken out.

1258. Will you explain to the Committee why you say that the present law would ruin your business?—If we were compelled to keep in that wire, we could not drive the place.

1259. But you have not been compelled to keep it in, have you?—The law says I am compelled to do so.

1260. But you have not kept it in, have you?—I have not.

1261. Supposing the law remains as it is, have you any reason to suppose you will be compelled to keep that wire in?—It amounts to this; if they compel me to do so it will wholly ruin my business.

1262. But you have not so far been compelled to keep it in, have you?—I have not, but I do not know how soon I may.

1263. You had no trouble to get exemption for the grating, I suppose?—None whatever.

1264. Who gave you that exemption?—I believe it was the Fishery Board in Dublin who sent that in.

1265. Through the fishery inspectors, I suppose?—Well, Sir Thomas Brady was there I believe.

1266. Would you think if any millowner showed reasonable grounds for having his grating altered or removed, or showed that it was interfering seriously with his business, he would not under those circumstances at once get an exemption?—I do not see why we should be in the hands of anyone.

1267. You are not answering my question; would he under those circumstances have any difficulty in getting an exemption?—It depends; he might or might not have.

1268. So far as your own mill is concerned, you have not been seriously stopped, have you?—No, because I do not allow it.

1269. Do you know of any mill in your own neighbourhood which has been stopped for any length of time?—I do, or at least I know that wire nettings have been evaded all over the country.

1270. Do you know of a mill which has been stopped for any length of time?—Yes, I know one.

1271. Will you mention the name of it?—I think Arthur's, of Kells, was stopped for a considerable time.

1272. How long was that mill stopped?—I could not say how long.

1273. You are speaking of facts, I suppose, within your own knowledge?—Yes.

1274. I am only asking you to tell us what you know of your own knowledge?—I must admit that it is only hearsay.

1275. You have two mills, I believe, have you not?—I have four altogether.

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1276. Are

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Mr. ROBINSON.

[Continued.]

Mr. Seton-Karr—continued.

1276. Are they all driven by turbines?—By four turbines and two breast wheels.

1277. That is the bucket wheel, is it not?—Yes, it is the bucket wheel.

1278. One of your lower mills is driven by a bucket wheel, is it not?—No, that is a turbine wheel; that is the lowest mill of all.

1279. How is the one above that driven?—The one above that has a turbine and two breast; and the one above that, again, has two turbines. That is on a tributary on the river Main.

1280. If the fish pass through the upper mill, is one right in saying they must run their chance a second time in passing through the lower?—Quite so.

1281. There is no way out except by going through the lower, is there?—None.

1282. You have got no bye-wash of any kind, have you?—Yes, there is a bye-wash.

1283. Could they not get out by that?—Yes; when the place was not working they could, certainly.

1284. Where is the bye-wash?—That is at the side of the mill.

1285. Is it between the two mills?—Yes, it is between the two mills.

1286. But it is only when the water is high, I suppose, they could get out by that bye-wash?—When the bye-wash is full they could get over it.

1287. You mean when the mill is not working?—Yes.

1288. When the mill is working they could not use the bye-wash, could they?—They could not.

1289. You spoke about anglers who got licenses for 1*l*.; what class of anglers are they?—I can go and get a license for 1*l*., and 6*sh* as much as I like.

1290. What class of men pay 1*l*. for their anglers' licenses?—Any man.

1291. But, as a matter of fact, what class of men are they?—My brother got a license.

1292. They are not the class of men, I suppose, who poach, are they?—No, I do not say they are, but we have plenty of poachers besides them.

1293. You said that anglers who paid 1*l*. for their license, would or could kill more salmon than all the mills in Ireland?—Yes, I say so.

1294. But they are not the class of men who do poach, are they?—No; I do not mean to say that they poach, but they fish.

1295. But they only fish in the season during which they are allowed by law, do they not?—But suppose they catch female salmon?

1296. The men who buy those licenses only catch salmon with a rod and line when they are allowed to do so, do they not?—Then, I say, they kill more salmon by doing that than all the wheels in Ireland.

1297. But they do it in a legitimate way?—Certainly; but I think the millowner is worth more than 1*l*.

1298. You were not suggesting that the anglers poach, were you?—No; I said there were poachers besides.

1299. Do you mean to say that those turbines do not do any injury at all to the fish?—I do.

Mr. Seton-Karr—continued.

1300. When you run these pieces of wood and turp through your turbine, are it running at the ordinary rate that you work your machinery?—Yes, at full speed, with the full power of the machinery on it.

1301. Was it at the ordinary rate you run when you are working your machinery?—Yes, at the ordinary rate.

1302. Is it possible that fish might be injured by the turbine, and get washed away in the tail-race, and you see nothing of them?—I think in our case it is scarcely possible. Of course, it might be so at night, but not in the daytime.

1303. Are you a fisherman?—When I was a boy I was, but latterly I have not much time to fish; I have a business to attend to.

1304. I suppose you have no time to watch the races yourself very much?—I have been watching them since this matter arose pretty often, to see if I could see anything.

1305. At what pace does the water run in your tail-race?—About 80 feet per minute.

1306. How often is the water clear in the race?—Except at floods it is nearly always clear.

1307. Does not the working of the machinery cause foam to float down on the surface of the water?—No, not with turbine wheels.

1308. Do you take the whole flow of the river?—In the dry season I do, but not in a wet season.

1309. Is there any kind of fry-guard that you would consent to placing in front of your turbines?—None that I know of. I am positive the turbines do not kill any fry.

1310. Would you consent to a perforated iron-plate?—No, I would not; it is simply impossible.

1311. Do you say it would interfere with the working of your machinery?—Yes, and even worse than that.

1312. Do you know that some mills, or one mill at all events, has such a perforated iron plate?—I know of one, but it is in a different position. It is a metal plate fixed at the bottom of the turbine, and has the whole pressure on it. Besides that, the same people would not erect it over again.

1313. Is there anything whatever in your mill-race to prevent fry or salmon going down towards your turbines?—Nothing.

1314. You merely have a wide grating, have you?—Yes, it is a grating of three-fourths of an inch and a 3-inch wheel; I am speaking of the turbines in the Malne river. At present, there is a grating before the turbine to protect it.

1315. That is close to the turbine, is it?—Yes.

1316. You have nothing at the head of the head-race, have you?—Nothing.

1317. Or nothing at the tail of the tail-race?—Nothing.

1318. Do you think much poaching goes on in the mill-race or tail-race?—I do not think it is in the tail-race, I think it is more in the river.

1319. Did you ever see salmon in your tail-race?—Never, since I was there.

1320. Would they ever run up the tail-race?—I have never seen them.

1321. Have

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Mr. ROBINSON.

[Continued.]

Mr. Seton-Karr—continued.

1331. Have you ever seen them dropping down the mill race?—No.

1332. Did you ever tell the inspector that you had to stop your mill on account of fry coming down into the race, or did you ever make any complaint about having to stop the mill?—No, never. I told the inspector I took out the wire nettings and threw them on the bank.

1333. Was nothing more done after that?—Nothing.

1334. Supposing that it was necessary that a large expense had to be incurred (assuming the fish are injured by getting into your turbines) in protecting the fish, would you, as a millowner, consent to bear any share of that expense?—I would not.

1335. Supposing that the onus of putting up and looking after gratings was thrown on the board of conservators, they would have to come on your land, or some one else's land, possibly, to look after the gratings, would they not?—Yes.

1336. As far as you are concerned as a millowner, would you give them every facility to come on your land?—I would, certainly.

1337. Supposing other landowners did not give them the same facilities?—Generally speaking, all the millowners have their head races on their own land.

1338. But where a head race is, say, half a mile long, it is very often I suppose the case that a millowner does not own the whole land, is it not?—Then I should suggest that the gratings be erected, if there were any erected at all, at the outside of the mills, not at the entrance of the head race at all.

1339. Do you mean close above the mills?—Yes, close above the mills.

1340. But that would not prevent salmon coming down the race, would it?—It would turn them back again.

1341. They could be more easily poached in the race, could they not?—I do not think so. I think it would be worse to poach in the head or tail races than to poach in shallow pools.

1342. It is a fact that the millowners generally always hold the land right up to the top of their races, is it not?—They do generally, but in some instances they do not.

1343. As far as you are concerned, you say you would give all facilities?—I would, certainly. I will say this: if the board of conservators send a man I will send a man to stop there two months, and if they can find any dead fish I will tell them to put up a netting. I think it is wrong to assume that the turbines kill fry when you have no proof of it. I think it is wrong to assume that.

1344. I suppose you desire to protect the fish so far as is compatible with the working of your mill?—I say turbines do not injure them.

1345. Do you desire or want to have the fish protected so far as is compatible with the working of your mill?—Quite so, I do. I would rather the fish were protected than not, so long as I was not injured.

1346. So long as the working of your mill is not interfered with you desire to have the fish protected, do you?—Certainly.

O.S.U.

Mr. T. W. Russell.

1337. Taking the law as it stands, what does it require of you in the way of putting up gratings and nettings?—It requires me to put up a 2-wire mesh, the same as that which is in the room here.

1338. Where?—At the outside of my works; not at the back of my turbine at all, but outside the works entirely.

1339. What else does it require?—That is all. It requires gratings, of course, but I have got exemption.

1340. You have told us that you have got gratings in front of the turbine wheels?—Yes.

1341. Are those required by law?—No, not that I know of.

1342. Then you have erected these gratings in front of the turbine wheel in order to protect the turbine from rubbish, have you?—Yes; quite so.

1343. Then am I to understand that the Irish fishery inspector gave you an exemption for that which you had not erected, and declined to give you an exemption for that which you had erected?—Yes.

1344. That is a most extraordinary thing, is it not?—That is the fact.

1345. Mr. Seton-Karr asked you whether you had not got all that you require by this exemption, and by your refusal to obey the law. I suppose you object to the uncertainty of the law, and so carrying on your business under that uncertainty?—I do, certainly. I object to the uncertainty of the parties who are going to administer the law. I say we have a right to have the law the same as the English law; I cannot see the equity of having the law different to what it is in England.

1346. Who was the fishery inspector who gave you the exemption?—I think it was Sir Thomas Brady.

1347. Of course you are aware Sir Thomas Brady is no longer in the service?—He has left since he gave me the exemption.

1348. And a new king now might arise who might not be of Sir Thomas's opinion, you think?—Quite so.

1349. Therefore do you object to carry on your business under the present state of things?—Yes; or run the risk of a new king arising.

1350. We have had some evidence as to the diminution of fish in these rivers; have you any theory with regard to that?—No; theory would only be opinion, and I was not allowed to give an opinion or state what I had heard when I gave evidence before.

1351. I will take your opinion if you please?—There are several causes. I say poaching is one.

1352. Has poaching increased?—I think it has not diminished. I think the decrease of the water in the rivers is another cause; our rivers have decreased, I suppose, during the last 50 years to an enormous extent by drainage.

1353. We had evidence the other day that the improvement in the drainage had lessened the supply of water in the rivers; is that so?—Yes, as to the regular supply. The floods are larger.

1354. Do you concur with the witnesses who gave

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Mr. ROBINSON.

[Continued.]

Mr. T. W. Russell—continued.

gave that evidence?—I do, and I think it lessens the feed of the salmon as well.

1355. Then do I understand that you inform the Committee, without the slightest reserve, that if this law was enforced you could not carry on your business?—I could not, and would not.

Mr. O'Neill.

1356. How long have you had those turbine wheels?—Three years. I might say the Killylodge one I have had more than three, but the Drumona one only two years.

1357. Did you put up a grating at the head of the head race at the time you put up the turbine wheel?—I put up no grating at the head of the head race, but in front of the turbine. The turbine is running in a square well, and in the front there is a grating put to keep any debris away from the turbine.

1358. After you had put up that grating near the turbine wheel, were you called upon by anybody to put up a grating at the head of the head race?—I was, and at the tail race.

1359. Who noticed you to do that?—Mr. Moul.

1360. Is he the bailiff to the conservators?—Yes. I did put up one grating at the tail race one season, but never at the head race.

1361. Then your works were never stopped, were they?—Only during the time I had up this wire netting which I was ordered to put up.

1362. Where was that?—At the outside of the works.

1363. You put that up, did you?—Yes, I put that up, and there was only one wheel running there for six weeks.

1364. Was that in consequence of this grating?—No. I will explain the matter to you with a paper and pencil. Here is the water-course, and here are the three wheels. When I put up the netting there this wheel was running, and the moment these two went on I could not drive the place at all, and the netting had to be taken down.

1365. How long after this turbine wheel was put up first of all was it before you were noticed to put up the grating at the head of the head race?—I suppose it was almost a year.

1366. Have you any idea why you got notice then; were they sending notices round generally?—They were sending notices everywhere to put them up. It was an unusual thing.

1367. And they had not been sending notices round before, had they?—Not that I am aware of, at least for some years. Four or five years ago, I think, the thing was not heard of at all so far as I know.

1368. You were speaking about poaching; how do they poach?—They poach with nets, and I

Mr. O'Neill—continued.

might say with torches and gaffs. They light a torch and the salmon comes to it, and they gaff them heavily. I am told.

1369. Have you ever seen it done?—No, but I have had workmen who have told me so.

1370. In what other way do they destroy fish?—With line.

1371. And with dynamite?—I do not know. I think they are always afraid to use dynamite. It is not an easy engine to work.

1372. Do you mean it is dangerous?—It is rather dangerous.

1373. Can the salmon go over your weir easily?—Yes, when the water is up, quite easily, I believe.

Mr. Pinkerton.

1374. Do you know Mr. Webb's mill?—I do; I have been into his place.

1375. What do you estimate the cost of the erection of gratings would be in his case?—Do you mean to put them in permanently?

1376. Yes?—Taking into consideration the stoppage of his works, and, of course, the time for doing the work, which would be a month, I should say it would take between 1,200 £. and 1,500 £. to do it properly.

1377. Mr. Webb gave evidence that it would cost 1,400 £.; what do you think of that?—I agree with that estimate.

1378. And the reason you say your mill was never stopped was because you never complied with the law?—Yes.

Mr. Cox.

1379. You spoke of the licenses, which were granted for 1 £., as being destructive to the fish; what remedy do you suggest for that?—Not to give licenses at all.

1380. Would not you give licenses to fish?—You say the salmon is diminishing. You cannot eat the salmon and have it, and if they are diminishing by too much catching and too much poaching, then I say stop it.

1381. For how long?—Say for a year. Then I would increase the price of the license.

1382. There are a great many places in other countries where you can fish for 2 s. 6 d., are there not?—That is very likely, but the cry here is that the millowners are diminishing the fish. We say it is not millowners but poachers and fishers.

1383. Is there not a close season in that river?—Yes, I believe there is.

1384. Then they are not allowed to fish then, are they?—They are allowed to fish in the autumn; I cannot tell you exactly when.

1385. When the salmon are going up to spawn are people allowed to fish and catch them?—Yes, they are.

Mr. ABRAHAM SHACKLETON, called in; and Examined.

Mr. Macartney.

1386. Are you a millowner?—Yes; I am a member of the firm of George Shackleton and Sons, carrying on their mills at Liscann, about six miles from Dublin on the Liffey.

1387. I believe you have turbine wheels?—We have a water wheel and a turbine.

Mr. Macartney—continued.

1388. Are you aware of other turbines on the river?—Yes; there is a woollen factory about a mile above us on the river, at which they have one or more turbines. I am not sure whether they have more than one, but they have one.

1389. There has been a considerable body of evidence

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Mr. SHACKLETON.

[Continued.]

Mr. Morarty—continued.

evidence given before the Committee, speaking to the merits of the turbine and its importance in developing the water-power; do you agree with that evidence?—I do. The Liffey is very subject to floods, and our water wheel is very frequently stopped by floods, sometimes for 24, 36, and 48 hours at a time. When we wanted to increase our power we came to the conclusion, from the information we got, that the turbine would be less affected by floods than the water wheel, and in that respect it had an advantage over the water wheel, and also that it gave a better percentage of power than any water wheel that we could erect.

1890. Then, speaking generally, with regard to the water-power of Ireland, do you consider the introduction of the turbine and its use of great importance?—I do. I believe there are a great many falls in Ireland where a turbine would cost less than a water wheel and give more power, and therefore it is a very useful power, and a desirable power to be extended in Ireland.

1891. In what conservancy district is your mill situated?—I should think it was the Dublin Conservancy. It is from Dublin that we get my notices.

1892. Have you heard of the prosecutions that have been carried on in county Antrim?—We understood that the law required certain nettings to be put up above the turbines, and when we heard so we were alarmed that we might be required to put up such things, because we knew it would interfere very materially with the use of the turbine. My opinion is that it would interfere in any river, but especially would it interfere in the Liffey, because there is a greater amount of leaves and weeds from the plantations on the banks of the river. We hoped we would not be required to do it; but, however, we got notice in November 1890 from the clerk of the conservators, drawing our attention to the fact that we should erect such nettings. Then he, or someone on behalf of the conservators, called at the mill. It was in November he first wrote to us calling our attention to the matter, and then he referred to an interview which Mr. Horseby had with us on the subject. This notice came on behalf of the inspectors of the Irish fisheries, drawing our attention to the requirements, and we heard so more from him until he called.

1893. What is the date of the notice from the inspectors?—The 18th November 1890.

1894. Can you quote any passage from the notice specifically stating what they require?—It says: "But the Section 4 of 32 & 33 Vict. c. 94, does not extend to the 30th section of 26 & 27 Vict. c. 114, which directs that, where turbines or similar hydraulic machines are used, the person owning or using the same shall, during the descent of salmon or young of salmon to the sea, provide a grating, or other efficient means, to prevent such salmon, or young of salmon, passing into such machine. (Penalty not exceeding 50 £, and 5 £ a day.)" Then he goes on to say: "The law is, therefore, imperative in requiring that, where turbines are used, gratings or other efficient means must be provided to prevent salmon, or young of salmon, passing into such machine." We did not do anything, and the inspector called to see

Mr. Morarty—continued.

the mills, and some conversation passed between him and my brother. I do not reside at the mills. Then this further letter, dated 24th February 1891, was addressed to my brother: "Referring to the inspection of certain mills in the River Liffey where turbines are used, and to the communication sent to you from the inspectors of Irish fisheries, I am directed by my conservators to inform you that a lattice or other efficient means must be placed at your mill race before the 1st of May in each year, to prevent salmon, or young of salmon, from passing into your turbine wheel during that month." That is signed by "W. Dodd, Clerk to the Board," and dated 24th February 1891. Then Mr. Dodd called at the mill some time after that, and spoke about the matter again. We had not erected anything of the sort, and on the 20th of May 1891 my brother, on behalf of the firm, wrote this letter: "William Dodd, Esquire, Dear Sir,—Referring to your letter of 24th February last, and to your visit here since, we have not erected the grating for the salmon fry yet. We have been watching the fry carefully, and have seen none going through the culvers that carries the water to the turbine; they are more likely to slip over the weir or go down the main stream through the water wheel. Possibly you are not aware that our turbine is an Alcott's turbine, and so the apertures through which the water flows are fully 3 inches wide, and so cannot injure the fry passing through. However, if it can be proved that our turbines injure them we shall have the necessary grating ready against next season." Then Mr. Dodd writes on the 9th of June 1891: "Sir,—I brought your letter of the 20th ultimo, relative to placing a grating in your mill race during the month of May in each year, before my board of conservators at their last meeting, and I am directed to inform you that the conservators cannot grant an exemption from a grating to any mill where a turbine is used, and that you have already incurred a heavy penalty by neglecting to obey the directions of the board, if they chose to prosecute." But they have never prosecuted, and they have left us alone since.

1895. Is that all?—Yes. This cessation of what I may call a persecution of us took place coincidentally with the proceedings in the north of Ireland.

1896. Do you connect the cessation with the events which took place in Antrim?—Well, they are coincident, at all events. I believe Mr. Hill, who is another millowner on the Liffey, went and had some interview with the conservators. At all events, the result is that they have let us alone since.

1897. You have been let alone?—Yes; but we view the enforcement of such a thing with great alarm, because it would have the effect of rendering our turbine useless during periods.

1898. And would it materially interfere with the business you carry on?—Decidedly it would.

1899. I believe you have been in correspondence with other millowners on the subject in the south and west of Ireland?—Yes; I have been speaking to some of them. There are a great number of millowners in the middle and south of Ireland who have turbines, and the only

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Mr. SHACKLETON.

[Continued.]

Mr. Mansergh—continued.

reason why they are not agitated and excited about it is because the law has not been put in force.

1400. But do they view it with apprehension?—Yes.

1401. You are able of your own knowledge to say that, are you?—Yes.

1402. Can you speak personally, yourself, about the question of injury to fish; you have read the extract from your brother's letter, but do you believe that any injury has accrued to the fish by the use of the turbine?—I am very seldom there, and am not a fisherman, but I think that what he says is a very reasonable thing. I do not know that there is any material injury done to the fish.

Mr. Hayden.

1403. Do you say that the turbine is much cheaper, and gives a more effective water-power?—Under some circumstances it does. In all cases I believe it gives more effective water-power, and in many cases it is a much cheaper machine than a water wheel.

1404. At all events, it is a greater advantage to the millowner, is it?—It is.

1405. If it should be proved that a salmon is killed by the turbine, would it not be fair that the millowners should contribute towards the preservation of the fish?—I think not; I think when we have dams on the river, and put up turbines without any expectation of such a thing, and it is sprung on us in this sort of way, and it is not for our benefit, I do not think we ought.

1406. You were in the habit, I suppose, of working the mill with the old wheel?—Yes.

1407. And you have taken advantage of an improvement, have you not?—Some of the fishery regulations, in connection with the old wheel, if they were put in force, would also interfere with our power. All these regulations, if carried out, would be injurious to the water wheel as well.

1408. But they were not carried out?—They were not carried out, they never have been.

1409. With whom would it lie to carry them out, the fishery inspectors or the board of conservators?—I cannot say.

1410. Have you never had the law applied with regard to them?—No; but it is an undesirable thing to have a law existing that would be oppressive if put into operation.

1411. If the law should be allowed to remain in existence, with whom would you wish the carrying out of it to lie, the conservators or the commissioners?—I am not sufficiently acquainted with the powers or position of those two bodies to say.

1412. Have you confidence in the board of conservators?—I think the board of conservators would look more after the rights of the salmon than after the rights of the millers. I understand the sympathies of the board of conservators are more with the sporting world than with the commercial world.

1413. Have they no interest in the mills outside the preservation of the fish?—I do not think they have much. I know, as regards the Liffey,

Mr. Hayden—continued.

the owners in the neighbourhood have generally shown a disposition to discourage the erection of machinery and mills.

1414. Is the board in any sense a representative body?—I do not know how it is formed. I have never considered or inquired into its constitution, but I know the sympathies of the conservators are with the sporting world, and with the fisheries.

1415. Irrespective of the interest of the millowners?—I think so. I know that some of these conservators are what is called hunting men, and their sympathies are more with sport, and that sort of thing, than with manufactures and machinery. I know that in county Kildare they do not show much interest in, and in many cases they show a wish to discourage, manufactures. Here is an instance; we have another mill on a canal, but our landlord objected to our raising the mill because he thought it would look ugly from his dwelling-house.

1416. Do you find that the general opinion of most of the landowners?—I think that is generally the feeling.

Mr. Tonderson.

1417. What is the nature of the business carried on in your mill?—Flour milling.

1418. Does that require a steady drive?—It does, decidedly, and even more so than it used to do; there has been a complete revolution in flour manufacture. The machinery is much more complicated than it was, and requires a much steadier drive than under the old system.

1419. How long do you say you have adopted the turbine?—I do not recollect, but I should say within 10 years.

1420. What motive-power had you before that?—A water wheel.

1421. Where is your mill situated?—At Lucan, county Dublin.

1422. Is that on the Liffey?—Yes.

1423. Is there much fish in the Liffey?—I believe there are a good many salmon.

1424. Do the salmon come up and down?—Yes, they do. I am not a fisherman, but I imagine their habits are the same as those in every other river.

1425. Do they go through the sewage of Dublin?—I never thought of that before. I suppose they have to go through it, and cannot help it, but I have never thought of that.

1426. Do you know whether the amount of fish has diminished since you have been there?—I do not know.

1427. Or do you attribute it to any cause?—There is a good deal of poaching on the river.

1428. You do not know what size of fish get there, do you?—I know there are plenty of 6 lbs. or 8 lbs. weight, and perhaps 10 lbs. or 12 lbs.

1429. Is yours an old mill race?—It is. Strictly speaking it is not a mill race; it is on the river. The weir is close to the mill, the river comes down here, and the mill is here built over the stream, and the weir runs along here, and when we are not using all the water the principal part of the river goes right over the weir. It is not a very high fall.

1430. Does

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Mr. SHACKLETON.

[Continued.]

Mr. Toulson—continued.

1430. Does the whole of the river go through your turbine?—Through the turbine wheel. In very dry weather it does. Then we must, of necessity, have a coarse grating to prevent boughs and sticks coming down the river getting in. This grating, of course, lets small things through, and, even as it is, we frequently have to get it cleaned in certain periods of the year.

1431. Where is that placed in the stream?—Across the front of the mill in the stream.

1432. That is to say, in the main stream of the Liffey?—Yes.

1433. All across the river?—Across in front of the mill. Strictly speaking, the river turns off to the right, and the portion we want goes on to the mill.

1434. Do you not call that the mill race?—A mill race is generally considered to be a thing like a canal where the water is taken some distance. Sometimes the water is taken at half a mile from the mill, but in our case the mill is built right over what was originally the river, and then the main body of the river turns round.

1435. Then the main body of the river been diverted by the weir?—I should think it has to some extent.

1436. How old do you suppose this mill is?—It is a very old mill. In our lease it is described as the Devil's Mills. There was a mill there from time immemorial. The tradition is that the original mill there was built by the Devil in one night. That mill, I suppose, went to ruin, because our mill was built in historical times; but still the country people call it the Devil's Mills. It is a very old mill.

1437. Is there any salmon ladder on the weir?—No, I think not.

1438. Do you know the height of the weir?—It is about 6 feet or 7 feet, I suppose. I have often seen the salmon leaping up.

1439. You speak of the feelings of the conservators being rather in favour of sporting?—I think so.

1440. But salmon is not altogether a question of sporting, is it; are there not people who get their livelihood out of fishing salmon?—I do not know. The principal legitimate fishing on the Liffey is done by fishermen for sport.

1441. But do not people take salmon at the mouth of the Liffey?—Yes; but I do not know anything about that; all I know is about fishing about the mill. I do not think it is a very important fishery, in fact.

Mr. Seton-Karr.

1442. There are a good many men employed in the salmon fisheries in Ireland, I suppose, along the coast?—I do not know much from my own personal knowledge about the salmon fisheries.

1443. But that is a well-known fact, is it not?—Yes.

1444. So that it is hardly fair to say that the conservators' sympathies are simply with the sporting world, is it?—I may be wrong in that, but I think that is so.

1445. If the supply of salmon was very much diminished, or even put an end to, it would inflict a very serious injury on the mercantile interests
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Mr. Seton-Karr—continued.

of Ireland, would it not?—I do not think the supply of salmon would be interfered with.

1446. That is not the question. It would inflict an injury if interfered with, would it not?—If interfered with, to a certain extent it would.

1447. Your turbine has only lately been put in, I believe?—It was put in a few years ago. I forget exactly the number of years.

1448. How much of the flow of the river do you take?—That varies at times; we take the whole flow at times. At times we have not enough, and we have a steam-engine as an auxiliary. At other times there is five or six, or seven times as much flow as we take.

1449. When the river is at its normal summer level, how much of the flow do you take?—I really could not answer that.

1450. Do you take nearly the whole of it?—In dry weather we do.

1451. I think you said you were not a fisherman, and take no interest in the fish?—I am not a fisherman.

1452. Can you tell us whether the turbines do any injury or not to the fish?—From what my brother says he thinks it is impossible; but I do not know of my own knowledge.

1453. It is not a question you have gone into at all, is it?—No.

1454. Then, for all you know to the contrary, your turbine may do a good deal of injury to the fish, may it not?—I think if it did my brother would not say that it was impossible, as he says here.

1455. I only want your own opinion?—My opinion must be formed by what other people say. He says here: "Possibly you are not aware that our turbine is an Alcott's turbine, and so the apertures through which the water flows are fully 3 inches wide, and so do not injure the fry passing through." I believe, if we tried that experiment Mr. Robinson tried, we should find it would come out all right.

1456. You have not tried it, have you?—No, we have not; but it is an interesting experiment, and we probably will try it.

1457. You spoke of poaching; in what way do they poach the Liffey?—I think they set lures, and I suppose they gaff the fish. I am not conversant enough with the matter to say.

1458. Do they poach in the neighbourhood of your mill at all?—I believe they have. I know that at Lucan Petty Sessions people have been occasionally summoned for poaching.

1459. Have you ever known of salmon being taken out of your mill race or tail race?—I have heard of such a thing being done; but, of course, we discourage it.

1460. Do you know, of your own knowledge, of anything of the kind?—I know the thing has been done; in fact, I remember at one time catching a man taking a salmon, and I prosecuted him.

1461. Where did he take it?—Somewhere out of the river. I think it was in a shallow part of the river.

1462. Was it in your race?—No, it was not in the tail race; it was out in the overflow, I think, as far as I recollect. It was dry weather.

1463. What do you call the overflow?—Where
the

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Mr. SHACKLETON.

[Continued.]

Mr. SEAN-KERR—continued.

the water goes away over the weir. My impression is that that is how it occurred. I think it was dry weather, and the mill was taking the full water, and when the mill was stopped the water was flowing over; it may have been flowing over for some hours. Of course, with a change in the level of the river, a salmon may get into difficulties, and that is how it got into shallow water, but a grating would not have prevented that.

1464. Then that salmon you speak of had not been into your race at all, you think?—No, I should say not.

1465. As a matter of fact, your mill has never been stopped by the operation of this law, has it?—No, it has not; but it would be if the law were put in force, and I think it is an undesirable thing to have laws existing that cannot be put in force. There are too many of them in Ireland already.

1466. But, as a matter of fact, you never have been stopped, have you?—No, we have never been stopped.

1467. Is there any kind of grating that you would consent to place in front of your turbine that would keep fry out?—No; I think there could be no grating that could be devised to keep fry out that would not be injurious to the working of the turbine.

1468. Have you ever seen or tried a perforated iron plate?—I have heard of them, but I do not see how that would act less injuriously than that grating. I think the leaves and weeds would catch in it just as much. What really stops us is the leaves that are floating.

1469. Have you ever heard of any millowners having any difficulty in getting exemptions?—We have not obtained exemption, because they told us plainly they could not give us exemption, but still the exemption is that they let us alone.

1470. But where they have discretion to give you exemption that discretion has always been exercised, has it not?—We have not got any formal exemption; we have been tolerated, but I do not call that exemption.

1471. Do you know of cases where exemptions have been given for gratings?—Exemptions are talked about, but I really do not know of any case.

1472. You, as a millowner, have no reason to complain of the action of the fisheries inspectors, have you?—No; as a millowner I have no reason to complain, but I think, as a member of the community at large, I have a reason to complain that laws exist and are not put into force.

Mr. T. W. Russell.

1473. We have had evidence here as to the superiority of the turbine over the old wheel. Do you think it is of importance that nothing should be done to prevent the development of the turbine in the south of Ireland as regards industries?—I do. I think it is very important, because it is a very suitable power. It is an economical power in two ways, namely, that it gives a larger percentage of power and, in many cases, costs less money.

1474. And do you think it extremely suitable for the south of Ireland?—It is.

Mr. T. W. Russell—continued.

1475. I do not understand that you come here to give any actual facts with regard to fish, or anything of that kind; you do not live at the mill at Lucan, do you?—I do not.

1476. You live at Dublin, seven miles off?—Yes; and I am very seldom at the mills.

1477. Therefore you do not come here to give evidence as to whether the salmon fry go through the turbine or not; you must take that on hearsay?—I must take that on hearsay.

1478. Your position is, that you are carrying on an industry at Lucan, and that the law of the country would cease that industry if it were enforced?—Yes, it would interfere with it.

1479. And that it has been sought to enforce that law elsewhere?—Yes.

1480. And, therefore, do you desire to have the law placed in such a position that your business cannot be interfered with?—Exactly so. I have no protection at present.

1481. Quite so. You object to carry on your business at the discretion of a fishery board or a fishery inspector, do you not?—Yes; for instance, whether rightly or wrongly, I think one reason among others why on the Liffey these things are not insisted on is, that the conservators are on very friendly terms with millowners on the Liffey. But that might not always be so; men might arise who knew not Joseph.

Mr. Pinkerton.

1482. I suppose the exemption that you have succeeded in getting has been largely due to the agitation started in county Antrim, has it not?—I think that must have had something to do with it. I have not had an exemption; I have been let alone.

Mr. T. W. Russell.

1483. I understand you have not complied with the law, and you have been let alone?—Yes.

Mr. Pinkerton.

1484. Are you of opinion that if the millowners in Antrim had remained quiet you would have been let alone?—I cannot say. It is very hard to answer that question. It is very hard to tell what is passing in the minds of the conservators.

1485. At the present time you are virtually at the mercy of the water authorities, are you not?—Most decidedly.

Dr. TANNER.

1486. Why is the turbine so suitable to the south of Ireland?—I should not say it is so altogether, but certainly where there is water-power, and especially high falls, it is suitable. Our own turbine is on a low fall, but it is peculiarly suitable for high falls, and there are in the south and west of Ireland a great many rapid streams.

1487. Do you not use the turbine mainly for the purpose of gaining increased force and regulating the flow?—The principal and chief reason why we put up the turbine was that we were of opinion, and I think are of opinion, we can work longer in case of flood. It is a great inconvenience to us, when a flood comes down, to have to shut the wheel down and let the mill stand idle.

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[Continued.]

Dr. Turner—continued.

idle for 24, 36, and 48 hours, and then to have to start again. The turbine will continue to give us power in a higher state of flood than the water-wheel.

1488. You mean it will regulate the flow?—Yes, that is so; but when the flood comes it lessens the fall. In fact, I have seen our weir entirely invisible in a high flood, and the wheel cannot work at all then; it is choked with back-water. But a turbine wheel gives some power when a water wheel will not give anything.

1489. Then a turbine does help to regulate the supply of water, does it?—It does; or the supply of power, rather.

1490. How is your turbine fed?—There is a pipe comes into it.

1491. Is there any side stream by which fish could escape; you have this grating there, and which nobody objects to, for preventing *elotie* getting into the wheel?—But that does not interfere with the fish passing up or down.

1492. Do the fish go between those bars?—I do not know. Some people say they do not like going between bars on account of the vibration.

1493. Is there any side issue in the stream that supplies your turbine by which fish can escape?—No, not between that grating and the machine. Before you come to the grating the spare water goes away up over the weir.

1494. In your opinion, would it be detrimental to your mill if any side stream was provided at this point or at the grating?—I think it would. Of course, if we were short of water, it would be a loss to us to take away the water right from the wheel.

1495. Your reason for objecting to this screen which has been suggested is, that it gets choked, is it?—Yes, it gets choked.

1496. When you have a flood in the river, does that choking proceed equally and impartially all over the screen, or is it confined only to certain portions of it?—The whole thing gets choked. It would be filled up like that one which is in the room.

1497. I see on that lattice a great number of leaves and floating matter; that being so, would not this detritus collect more on the surface, and gather on the top of the screen rather than at the bottom?—Perhaps it would be more at the top, but still the effect would be that it would get choked first at the top, and then all down to the bottom it would gradually get choked up.

Dr. Turner—continued.

1498. On the contrary, do you not see the leaves, and so on, piled up on the netting above the surface, rather than going below the surface of the water?—No.

1499. In your opinion, does the turbine actually kill fish?—I am told that it does not; I have never seen fish killed by it.

1500. Do you know anything about the value of the fisheries on the river Liffey to the riparian proprietors?—I do not know anything about that.

1501. Do you know whether the landowners on the Upper Liffey get any considerable income from letting their fisheries?—I do not think so; they preserve them, but I do not think they get anything. If anyone owns the banks, they will not allow any stranger to come and fish there.

1502. Do the landowners, or riparian proprietors, contribute much towards the preservation of the fish?—I do not know what they do in that way.

Chairman.

1503. You say you object to any restrictions whatever?—I would rather not have any restrictions.

1504. But supposing these restrictions, without doing you any harm, enabled another industry to be carried on, would you object to them then?—I do not think it would be possible to have any grating or netting there.

1505. But suppose something effectual could be done, would you still object?—If there could be anything devised that would do me no harm, and serve the fish, I have no objection; I am not hostile to the fishing interests at all.

Mr. Seton-Karr.

1506. Would you mind telling me the size of your turbine?—I saw it as it was being put down, and I have not seen it for years, because it is in a place where we cannot see it; I believe it is five or six feet across.

1507. Is that a large turbine?—It is a large turbine, because the fall is low, and with a low fall you must have a large turbine.

1508. What revolution does it make per minute, do you know?—I think it is about 60 or 70.

1509. Do you mean 160?—I cannot tell you exactly.

1510. You are not prepared to tell us that exactly, are you?—No, I am not, but that is my impression.

MR. R. P. CARSE, called in; and Examined.

Mr. Macartney.

1511. I BELIEVE you carry on business at Manchester?—Yes.

1512. Do you appear here both as a buyer of finished Irish cotton goods, and as a finisher of cotton goods in Ireland?—Yes.

1513. I believe you buy for the firm of Messrs. J. and N. Phillips and Company of Manchester?—Yes.

1514. Have you two sets of works in Ireland?—I have
0.80.

Mr. Macartney—continued.

1515. Will you tell the Committee where they are situated?—One is situated at White Park, close beside Ballyclare, about 10 miles from Belfast.

1516. Is that driven by water power?—Yes, it is driven by water power.

1517. Have you a turbine there?—We have a turbine not in use at present.

1518. Where is the other?—At Moorfields, six miles from Ballymena.

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1519. Do

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Mr. CARSE.

[Continued.]

Mr. Morant—continued.

1519. Do you use the turbine there?—We do.
 1520. How many hands do you employ now?
 —One hundred and fifty.

1521. I believe your works are exclusively used for bleaching, dyeing, and finishing cotton goods?—Exclusively.

1522. You do not deal with linen at all, do you?—No, we do not finish a piece of linen.

1523. What trade do you supply?—The home trade, the Colonies, the States; but I think our principal trade is India and China, going through the Manchester houses.

1524. For the cotton goods that go backwards and forwards between your works in Ireland and Lancashire, of course, in competition with Lancashire finished goods, you have to pay additional carriage, do you not?—We pay carriage backwards and forwards, of course.

1525. Will you explain to the Committee how it is that you are to finish them in Ireland?—In Lancashire they go in for cheap, quick work. The air and water is purer in Ulster than in Lancashire. There is another reason, if I may add it; we get a better colour and a better finish than we could get in Lancashire. Then we have water power there, which is a great saving in the use of coal, our works cost less, and our wages are lower. I pay 90 l. a week wages for 150 hands. I should think I would have to pay 150 l. a week in Lancashire for the same number of hands; so that is a distinct advantage to us.

1526. What horse power do you employ?—Two hundred horse-power on the two works.

1527. What do you calculate you save a day in coals?—About six to seven tons of coals at 14 s. a ton, which is our average price; that is, about 4 l. a day.

1528. There is plenty of available water power still in Ireland, is there not?—Yes.

1529. Is there in Lancashire?—Not much. In fact, the water is pretty well used up. They are sinking artesian wells in Lancashire now at most of the works, because they cannot get enough water.

1530. There is a certain difficulty, too, in Lancashire in using water as a power on account of the natural formation of the ground, is there not?—Yes; it is a flat country, and we do not get the power; then coal is only 5 s. or 6 s. a ton, so that it is not so valuable to them as it is to us.

1531. Where are your chief competitors?—Not in Lancashire. In Cardale there are the Fergusons, and in Scotland I could give the names of many people. Fulmer, and people of one, that type, where they have water power like ours, and also in Mulhouse and throughout Alsace.

1532. I think you are aware there exists under the law in Ireland restrictions with regard to the use of water in connection with turbines generally which do not exist in England or in Scotland?—Yes, and against that I protest. It would be what I would call in railway language a preferential rate against a competing industry, and that would be most unfair to us, and it would destroy our power of competing if our water power was interfered with.

1533. If the present restrictions are continued, do you say you, as an employer of water power

Mr. Morant—continued.

in Ireland, will be under an unfair disadvantage as compared with your Scotch and foreign competitors?—Precisely so.

1534. I believe it would injure the cotton manufactories more than almost any other industry, would it not?—They would suffer more. The cotton manufactories would not suffer, but the cotton finishers would, because the linen is of course made and sold on the spot, but we have to send the cotton goods over from Lancashire and take them back again, and that is of course a handicap against us.

1535. There has been a great development, I believe, in the cotton bleaching and dyeing trade in Ireland, has there not?—There is a very great demand for it; I cannot possibly meet it, and I will increase my works largely if I am not harassed by legislation.

1536. Are you looking forward to a development of the trade owing to the Manchester trade?—Undoubtedly the cotton trade is always increasing, and they want further outlets.

1537. Do you believe that this trade will become of great importance to the province of Ulster?—I believe it will be of very great importance almost as great as the linen trade.

Mr. Hoyle.

1538. Have you any opinion as to the effect on fish of a turbine wheel?—No; I can merely give you the reports of my managers second-hand.

1539. But you do believe the turbines are interfered with, do you?—I know they complain to me that they have to clean them continually in certain weather.

1540. Except for the fact of having to employ one or two men for each mill, does it interfere with the work?—I am not an expert. My men report it does injure them.

Mr. Timmins.

1541. What part of Lancashire do the cotton goods come from that supply your works in Ireland?—They come from Manchester, which is the great dépôt for cloth. Of course, they come in the first place from the various mills throughout the country.

1542. There is a good deal of bleaching carried on at Bolton, is there not?—An enormous quantity.

1543. Then why do you say that is not in competition with you?—They cannot give the finish, and they cannot get the colour. They go in for rapid work, great speed. In Ireland, with our water power, we can afford to give more time, and we get a better result.

1544. When you speak of Lancashire being a flat country, what part do you allude to?—Running from Manchester down to Fleetwood, just Bolton and Chorley, and that neighbourhood.

1545. Do you call Accrington and that part flat?—No; but I do not think there is very much bleaching done there.

1546. There is some done there, is there not?—There is not much done, but Bolton is the great head-quarters of the bleaching trade in Lancashire.

1547. What

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Mr. CARSE.

[Continued.]

Mr. Thompson—continued.

1547. What shipping port do you use for your goods chiefly?—I think you must have misunderstood me. I finish goods for certain markets, which goods are sent to me from Manchester, and they are sent to every port.

1548. By what route are they sent from Manchester?—I do not know; when I have put them in the warehouse, I have done with them.

Mr. SETON-KARR.

1549. Do you know that millowners in Scotland are compelled by law to put up gratings whether they have turbines or not?—I do not. I have been told we are prejudicially affected as compared with Scotch and English fishers.

1550. But if they are compelled by law to put up gratings, whether they have turbines or not, surely they are under the very restrictions that you complain of, are they not?—That would withdraw my complaint against them, but would not prevent me from protesting against injury done to myself by this special Act.

1551. Quite so; but supposing you were under the same law as Scotland, you would not suffer any disadvantage, would you?—It would deprive me of my argument against them.

1552. But you have heard that they are compelled to put up gratings?—This is the first time I have heard of it.

1553. I thought you said you knew it?—I must have misunderstood you.

1554. I think you give no opinion as to the injury inflicted by your turbines on the fish?—No.

1555. Is it a subject you know nothing about?—Yes.

1556. Do you know whether you had lattices in front of your turbines at Moorfields Works?—I saw, some time ago, one of our turbines with a grating in front of it. I do not think it was such a close thing as the one in the room, speaking from memory.

1557. That is at your own mill?—Yes.

1558. Was any complaint made about that lattice at that time?—Not on that particular day perhaps, but general complaints were made of the inconvenience and trouble. It stopped the machinery or made the power less, and then it had to be looked after.

1559. How long was that lattice up in front of your turbine?—I could not tell you. I only go there about half a dozen times a year, so that I do not see much of it.

1560. The working of your mills has never been interfered with in any way by the existence of lattices, has it?—I have already said my men have complained of suffering in consequence.

1561. I ask you have they ever been stopped?—Very likely.

1562. Do you not know whether they have or not?—No; but I know the power has been reduced. No doubt some of the engines have been stopped. If a certain amount of water power is taken away some of them will stop, but I would not like to say the whole place has been closed.

1563. You, as the buyer for your firm, must know whether your trade has been interfered with by the existing law, must you not?—I do so.

Mr. SETON-KARR—continued.

should merely take the report of my men in Ireland with regard to it.

1564. As you have told us, they have made complaints?—Certainly.

1565. But I am asking you, as a matter of fact, has the working of your mill or trade been in any way injured?—Yes, certainly. Even half-an-hour, although it would be almost immeasurable, would be half-an-hour's loss of work.

1566. When you say your trade has been interfered with, do you mean that your mill has been stopped for half-an-hour?—I do not know.

1567. But surely if the existing law had injured your trade to any great extent, you would be able to tell the Committee what the exact amount of injury has been?—My men have complained to me that it injured them. I was not there, and I have not a written report of what they said.

1568. Cannot you tell us to what extent it injured you; can you give us no further particulars?—I cannot give you an estimate.

1569. As a matter of fact, I do not suppose the working of your mill has been seriously interfered with, has it?—Of course you are at liberty to form any conclusion you please, but I cannot tell you anything definitely.

1570. And you are not prepared to tell us anything more on that point?—I do not know anything more.

Chairman.

1571. If you are not aware of it, I suppose no one else can be?—Yes, the men in my employ are fully aware of it, and did report to me.

Mr. SETON-KARR.

1572. We will take it from you that although you had complaints from your men that these lattices have interfered with the working of your mill, you are not prepared to tell the Committee that any serious injury has been inflicted on you?—I could not give any specific case of injury.

1573. How much of the flow of the river do you take into your mill, do you happen to know?—We have what is known as a mill-race, but I cannot tell you. I have never seen even where it is taken in.

1574. I want your opinion upon this; supposing it was necessary to incur a large expenditure in protecting fish against your turbines, would you as a millowner be prepared to share any of that expense?—I would object. I think it was unjust to put up anything that would interfere with our established business, and I think it ought to be put right without charging us anything.

1575. Would you be prepared to give all protection to the fish provided that protection does not interfere with the working of your mill?—Gladly.

1576. You would only be too glad to protect the salmon industry?—Gladly, so long as it does not interfere with a far more important business.

Mr. O'NEILL.

1577. Do I understand that you have a grating at the head of your mill-race?—Just before it goes into the turbine.

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1578. Only

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MR. CAUSE.

[Continued.]

Mr. O'Neill—continued.

1578. Only at the turbine?—That is the only one I ever saw.

1579. Have you ever been called upon to erect any others?—I do not know.

1580. Then is it this setting at the turbine wheel which you say interferes with the power of the water?—That is the only thing I have ever seen.

1581. Then what complaint did your manager make?—That it got clogged up with dirt and leaves. That is all I remember, and I cannot say anything further.

1582. Then, as a matter of fact, you have not any gratings now except this one at the wheel?—I have said I do not know. If we are compelled to have them by law, no doubt we will have them at the very head of the race.

1583. That is rather different from what a good many of the other millowners say. They say they have not put them up although they have been called on to do so?—I do not know.

Mr. CHARLES JAMES WEBB, called in; and farther Examined.

Mr. Macartney.

1588. WITH reference to the first summons which you received, no written notices were served upon you on behalf of the Conservators or Inspectors of Fisheries, I understand?—No, no written notice. I was verbally noticed on several occasions by Moul.

1589. About a year before that you think you had a written notice, do you not?—I think so.

1590. But in the months immediately preceding the prosecution, were there any written notices?—No, nor for a year preceding for that matter.

1591. But the local inspector, Moul, called upon you several times, did he not?—Moul called upon me several times.

1592. When was that?—That was during the year 1890. He called, I think, about four times, and on each occasion I told him that my mill was killing no fish, and also that the erections which he demanded would destroy the power.

1593. I believe you received a summons on on the 25th September 1890, did you not?—Yes; it was on the 25th day of September 1890 that I received the first summons.

1594. That is a summons at the instance of Edward Moul, is it not?—It is, at the instance of Edward Moul.

1595. Then, I think, you received after that a second summons, which you cannot find?—Yes, I think I have it. After that the next notice I received was on the 18th or 19th of February. Moul called at my office and sent me up word that the Inspector of Fisheries wanted to see me. I came down expecting to see Sir Thomas Brody, and I found Mr. Moul sitting with his legs crossed in my office, and he gave me a notice.

1596. That is a notice to millowners, headed, "Turbines," dated at the Irish Fishery Office, Dublin Castle, 14th day of April 1890, and signed by order, M. P. Dowling, Secretary; and it quotes the 30th section of the Act of 26th and

Mr. O'Neill—continued.

but should think we should have been compelled to do it.

1584. Do you say that the cotton industry in Ulster is likely to increase?—I think it is certain to increase.

1585. Is it a well known thing in Manchester that the Irish flax is better than the English?—It is recognised, and they pay more for it.

1586. And do you think in consequence that other people will send over cotton and erect mills?—They are sending over cotton.

1587. Is it your deliberate opinion that if this law about the gratings is not altered there will be a serious check on the increase of the cotton trade in Ulster?—I cannot answer that at all, because I do not know myself as an expert to what extent it interferes. I have to take the reports of my men, so I do not want to say anything I cannot personally prove. I know all about the cotton trade and its prospects, but it is hardly fair to ask me that question, because I do not know anything about it.

Mr. Macartney—continued.

27th Victoria, does it not?—Yes. The notice is as follows:—"Fisheries, Ireland. 32 & 33 Victoria, chapter 92, and the Acts incorporated therewith. Notice to Millowners. Turbines. The Inspectors of Irish Fisheries desire to draw the attention of owners of mills in Ireland in which turbines, or similar hydraulic machines, may be used, to the obligation imposed on them by law to erect gratings, or other efficient means, to prevent salmon, or young of salmon, from passing into such machines. The 30th section of the Act 36 & 27 Vict. cap. 114, is as follows: "Where a turbine, or similar hydraulic machine, which may be injurious to salmon, or the young of salmon, in their descent to the sea is supplied from a river frequented by salmon, the person owning or using such machine shall, during the time in which such descent to the sea takes place, provide grating, or other efficient means, to prevent such salmon, or young of salmon, from passing into such machine, and in case such means be not provided, such person shall forfeit a sum not exceeding 50 £, and also a sum not exceeding 5 £ for each day during which such injury to the fry continues. The Inspectors hereby warn all persons interested that the law regarding this matter will be enforced. By order, M. P. Dowling, Secretary. Dated at the Irish Fisheries Office, Dublin Castle, this 14th day of April 1890."

1597. After that interview, did you receive a letter, dated 19th February 1891?—I received this letter from Moul by post. "Ballymena, 19th February 1891. Charles J. Webb, Esq. Sir,—I visited your works to-day, and have found that there is no wire latticing erected in front of your turbines. I have therefore to notify you that unless wire latticing be erected in accordance with fishery laws not later than the outside 24th February instant, I will have to take legal proceedings without further notice. Yours, &c.

Edward

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Mr. WERR.

[Continued.]

Mr. McCarthy—continued.

Edward Meala. "It might be noted that that letter is dated 19th February; I received it on the 20th, and I had just four days to put up these erections, or else I would be prosecuted."

1598. Then you received a third summons, I believe, on the 18th March 1891?—Yes.

1599. That was also at the instance of Edward Meala, was it not?—I received two summonses, dated 18th March, one to put up lattices and gratings at my head and tail races, and another to put up lattices before my turbines.

Mr. Setau-Karr.

1600. One or two of the other witnesses, and I think you yourself, have talked about leaves stopping up these lattices?—Yes.

1601. It is a matter you have practical knowledge of, I think, have you not?—Yes.

1602. Do not the leaves, when they come floating down the river up against the lattices, pile up on the surface of the water against the lattice?—A leaf saturated with water is almost of the same specific gravity as the water; some leaves will float on the top, and others really, where there is a current, pass through it. Therefore some sink and some rise.

1603. But, from your own observation, have you not noticed that leaves floating down the surface will pile up against the lattice for some time before they sink?—Yes; some, a beech leaf, for instance, will not float; it sinks, as it is heavier.

1604. I am talking of the general bulk of the leaves?—Yes; for instance, on the lattice which is here, you see there are more leaves on the upper part than on the lower part.

1605. Supposing that a man was in attendance at certain times to clear away the leaves on the surface of the water, they would never have a chance of blocking up the lower part of the lattice, would they?—No; they do not sink; wherever they stay they remain. These leaves which are there will have practically deposited themselves there; they do not slip up. I saw the very place from where that lattice was taken, and I suppose there was a pile of leaves 2 or 3 feet high where they had been making efforts to clear them off.

1606. Is it not a fact that, supposing a lattice is properly looked after and the leaves piled on the surface of the water against the lattice were cleared away, the lower part of the lattice, to all intents and purposes, would be kept clear?—No, it is not so. It is not so there, you see.

1607. It is possible that lattice might not have been properly looked after, is it not?—You had the sworn evidence that in 20 instances it gathered like that, and then again, I think, in two hours in the same way, and it is exactly as it was drawn out then.

1608. And do you say it would be impossible with the most careful cleaning to keep the lower part of the lattice clear?—Absolutely; it is a perfectly childish thing to think of putting up a lattice in that way. As you have asked me the question, I may say, on a point that Mr. Carse was asked about with regard to nettings, and which he was not able to reply to; that is, I was at his place the week before last, and his

0.80.

Mr. Setau-Karr—continued.

foreman was not using it at all. He had pitched it out; he said it had stopped the place.

1609. As a matter of fact, his foreman pitched it out before his works had been seriously interfered with, had it not?—No, it stopped his machinery.

1610. For how long?—I stated, I think, that it was almost at once. That was one of the places I gave evidence about, and he told me he had pitched it out and declined to put it in.

1611. I think you said it was not stopped up more than half an hour or so?—I do not think I said that. I said the information he gave me was, that he found the whole thing utterly impracticable, and he threw it out. I think you asked me, did he practise some deception, and I said I did not think that he did, as it was lying there visible to everybody.

Mr. Tadmire.

1612. Have you examined this grating which is here closely?—Yes, I have. I'm fast I tried it myself at the place.

1613. Did you notice, in addition to the accumulation of the leaves, that there is in this part a large amount of fibrous material?—Yes, there is.

1614. Is it your opinion that that would materially diminish the flow of water through it?—That, of course, has a considerable effect on it. That happens to come down from the mills immediately above.

1615. And that seems to be more in the water than out of the water, judging from the thing itself, does it not?—Yes, I think so. I judge simply by seeing the leaves at this end, and that fibrous material is at the bottom.

1616. Have you noticed whether this or that part is more obstructed by the fibrous material?—I take it that it is heavier than the leaves, and so goes to the bottom. But you will bear in mind there were a vast number of loose leaves; those are simply the leaves that were glued to it by the fibre. The leaves were lying at the place in a heap, 2 feet or 3 feet high.

1617. Do you consider this fibre would be a serious obstruction?—It would. I believe some of that is wool. There was a lot of loose scutch, too. I believe it is the washing of the wool to a great extent.

1618. Would that, do you think, interfere with the flow of the water?—Very materially.

Mr. McCarthy.

1619. With regard to the temporary stoppages of Mr. Carse's mills, and Mr. Arthur's mills, if those gratings had been kept in they would be stopped at the present day, would they not?—They would be, and Mr. Ross's is identically the same.

1620. So that, in fact, no serious injury has been done to their trade from the fact that almost immediately they found they could not work the mills with these things in they threw them out?—Yes; or as one of them told me, he had decided to live the life of an outlaw until the law was changed.

1621. Independent altogether of the question of leaves, or any other refuse that comes down the river, and which chokes up the wire nettings

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Mr. WHEER.

[Continued.]

Mr. Macartney—continued.

and gratings, such as that which we had before us, is in your opinion, is it not, that a wire grating like that, even if absolutely clear, would considerably and seriously impair the water-power?—Unquestionably; I think by one-half it was calculated it would be.

Chairman.

1622. Who devised this netting, do you know?—Some fool, I think. I do not know who he was. Some one in the Fishery Office, I suppose.

1623. Do you not know where it originated?—I do not know at all.

1624. If you had been asked you would have constructed a netting; I suppose that would have avoided the difficulties?—No; I do not think any netting could deal with it at all, or anything of that description; it would be absolutely impossible; it is a very foolish thing.

Mr. Cuz.

1625. You stated in your examination on the first day that pressure was brought to bear on Sir Thomas Brady to come down and give you exemption?—Yes.

1626. How was that pressure brought to bear upon him?—I was asked the question direct, "Was pressure brought to bear?" and to a certain extent there was pressure brought in this way: that questions were put in the House of Commons, after I had applied for exemption, and after I had received a letter, which I happen to have here, stating that questions were put in the House of Commons; and also action was taken in the neighbourhood of Randalstown or Ballymena with regard to those meetings. I do not say that the pressure was necessary to make Sir Thomas Brady do his duty. I do not think it was. I think his inclination was to do his duty.

1627. Then, when he came down and saw the place, he had no hesitation whatever in granting the exemption, had he?—He had no hesitation in granting the exemption in regard to the head race and tail race, but with regard to the turbine wheels he told me distinctly he had no legal power to grant exemption.

1628. Did he tell you that he could not do it?—He told me he could not do it, and I believe such is the case.

1629. Was the water bailiff there on the occasion of Sir Thomas Brady's visit?—He was there.

Mr. Macartney.

1630. I think I put the question to you with regard to the pressure put upon the Fishery Commissioners, and of course you are aware, are

Mr. Macartney—continued.

you not, that I meant the ordinary Parliamentary pressure which is put by a representative in the House to get a Department to do something or other?—I understood so.

1631. Are you aware, by the communications you had with me, that, in addition to the pressure put in the House, I was only using the ordinary amount of pressure brought to bear in such cases?—That is all.

Mr. Seton-Karr.

1632. Do you know the Liffey at all?—Yes, I do.

1633. Do you know it well?—Pretty well.

1634. Do you know the mills on it?—Yes.

1635. I suppose you know that a considerable number of men earn their livelihood by fishing rights under the common law in the Liffey, do you not?—How do you mean?

1636. That they earn their livelihood by fishing on the Liffey?—I am not aware of that. I think not. I have been up and down the Liffey and fished in the Liffey, but I never heard of any fishery such as we have. I know that it is an angling river, or that was my idea.

1637. Are there not fishermen who earn their living by fishing at the mouth of the river?—I think not.

1638. Or up and down the river?—I believe not on the Liffey.

1639. You are not prepared to say that, are you?—I have been up and down it many and many a time, and never heard of such a thing.

1640. There are plenty of salmon in the Liffey, are there not?—Not very many.

1641. It is a salmon river, is it not?—Yes.

1642. Is there a good spawning ground at the head of it?—Higher up, I think, there are good breeding grounds above the salmon leap, but there are comparatively few salmon in the Liffey compared to our river. I fancy that the sewage of Dublin which they have to pass through is probably injuring the fish.

1643. I suppose if it was not for the sewage of Dublin it would be a very good salmon river, would it not?—I should think so.

Mr. Tomlinson.

1644. Where is the salmon leap you speak of?—About five miles above Lucan, above Mr. Shackleton's place.

1645. Is it easy for the salmon to get over it?—No; it is very astonishing how they do get over it. I have seen them jump 12 and 13 feet high there.

1646. Are there any salmon ladders at the weir?—There are, on the Liffey.

1647. Then there is no want of appliances of that kind?—No.

Friday, 1st April 1892.

MEMBERS PRESENT :

Mr. Cox.
Sir John Whittaker Ellis.
Mr. Hayden.
Mr. Macartney.
Mr. O'Neill.

Mr. Pinkerton.
Mr. Seton-Karr.
Dr. Tanner.
Mr. Tomlinson.

SIR JOHN WHITTAKER ELLIS, BART., IN THE CHAIR.

Mr. THOMAS McDERMOTT, called in ; and Examined.

Mr. Seton-Karr.

Mr. Seton-Karr—continued.

1646. I BELIEVE you are an inspector for the Londonderry district of fisheries?—Yes.

1648. How long have you been engaged in looking after the preservation of fish?—Twenty-five years.

1650. What are the districts that you are acquainted with?—I am acquainted with Londonderry in particular, Ballyshannon and Coleraine.

1651. Do you know all the district of the Foyle and its tributaries?—I do.

1652. Can you tell us roughly how many men are employed in the fishing industry in that district?—Do you mean in fishing?

1653. Yes?—About 200 in the Foyle.

1654. Can you give us any idea how many are employed in the other districts you have mentioned?—Do you want to know how many are fishing outside in the sea?

1655. No; I mean in the whole of the districts you speak of?—There would be fully 1,000 on the Foyle and round that coast.

Mr. Macartney.

1656. Do you mean employed in salmon fishing?—Yes.

Mr. Seton-Karr.

1657. Do you know all the mills on the Foyle?—I do.

1658. Do you know if salmon and fry in their migration pass through many of these mills?—A great many of them do.

1659. Do you know of any of them getting killed in the machinery of these mills?—Yes, I do.

1660. Will you kindly give us some particulars on that point?—There is a mill on the Fungian, one of the tributaries of the Foyle, owned by the Messrs. Ballantyne Brothers, where the head race is about 300 yards long, and the tail race is about 200 yards long; and nearly all the salmon passing down the river pass through the works of this mill.

1661. What kind of mill is it?—It is a bucket wheel mill.

1662. It is not a turbine?—No, it is not a turbine. In one season the bailiff showed me 32 dead salmon that had got into the tail race.

O.69.

1663. Were they in the tail race?—They were all got in the tail race. I saw nine last year got in the same place, and on Sunday week last four were got in the same place. I should tell you that it is only on Sundays that salmon can be got here. The mill works continuously the whole week from 12 o'clock on Monday morning to 12 o'clock on Saturday night, and then, when the mill is stopped on the Sunday fish can be got, and only then.

1664. During the week, when it is working, the race is full of water, is it not?—Yes; and you could not get the fish.

1665. And I suppose then the dead salmon would be swept away into the river, and would not be seen?—They would, every one of them.

1666. Do you believe that many of the fish coming down the Fungian are killed passing through this mill?—Yes.

1667. What means did you take to find that out?—I believe most of the fish coming down the Fungian pass through the mill, and I never knew any pass through alive. At one time, to test the matter, I put a net in the tail race, which remained there for a short time, but the workpeople from the mills sent down such a lot of bushes that the net got choked, and I had to remove it.

1668. How came they to send these bushes down?—I think they did not want us to be there to make experiments.

1669. Did the net have any effect on the tail race in sending the water back?—No; I marked the water before it was put in, and it made no difference whatever.

1670. It did not interfere in any way with the working of the wheel, did it?—Not at all.

1671. Can you describe the position of the head and tail race, and whether there were any gratings or not?—No, there are no gratings on either the head or tail race, and there is no byewash, so that every fish coming down that way is passed through the works of the mill.

1672. Do they all have to go through the wheel?—Most of them go through the wheel.

1673. What appearance did the salmon which you found dead present?—They were all crushed through; their hanks were broken, as if they had

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Mr. McDermott.

[Continued.]

Mr. Selous-Kerr—continued.

had been nipped between the breastwork of the mill race and the edge of the bucket wheel.

1674. Could a bye-wash be made without injuring or affecting the working of the mill?—It could, and, in fact, there was one there at one time, but the father of the present owners built it up.

1675. For what reason, do you know?—I cannot tell you any reason why he built it up.

1676. Do you, as an inspector of fisheries, say that a bye-wash could be placed there without affecting the working of the mill?—Undoubtedly.

1677. What other protections could you put on these races without affecting the working of the mill?—I would put gratings or some other construction that would prevent the fish getting in.

1678. Would you put the gratings at the head of the race?—Yes.

1679. And another one at the head of the tail race?—I do not look upon the tail race as so important. It requires more watching. We have had two men prosecuted for taking fish out of the tail race this season.

1680. Of course, if you had a grating at the head of the head race the danger would not be there?—Yes; the fishing in the tail race takes place when salmons are ascending the rivers; the killing of fish by the wheel is generally when salmons are descending the rivers after spawning.

1681. Have you seen great runs of salmon fry at any other mills in your district, and where?—Yes; at Zion Mills, a large spinning factory on the Mourne, owned by Messrs. Hurdman, I have counted salmon dropping down the head race at the rate of 50 an hour, together with shoals of fry.

1682. Are there turbines at Zion Mills?—No; there are very large bucket wheels there. I should say that their head race is over 300 yards long. It is 40 feet broad and 7 feet deep. It takes all the waters of the Mourne for eight months of the year, except when there is flood.

1683. What is the Mourne?—It is the leading tributary of the Foyle, and it comprises three-fourths of the breeding ground of the Foyle.

1684. Did you ever see any fish killed by the Zion Mills?—No, never. As I have said, their wheels are large bucket wheels, and I think not many fish are killed on their wheels, and I do not believe fry are killed at all. I should add that the owners of the mills are very friendly to the fisheries, and open and shut the sluices just as we want, and give us every facility they can give.

1685. And they do not find that that interferes at all with the working of their mill, do they?—Oh, no.

1686. What do you think would happen to the Foyle fisheries if these mills changed their bucket wheels into turbines without protection?—I believe it would destroy the salmon, as it has done on the Bonn.

1687. Do you believe the fisheries of the Foyle are being destroyed?—Yes.

Chairman.

1688. You say the same as the Bonn has been destroyed?—Yes.

Chairman—continued.

1689. Are you prepared to give positive evidence that the Bonn has been destroyed?—Yes.

Mr. Selous-Kerr.

1690. Do mills and weirs entail additional cost in watching?—Yes; the additional cost in watching mills would be, I should say (taking the case of the Foyle), fully half; that is, the mills and works appurtenant to the mills.

1691. What are the special means you have to take in watching mills and weirs?—We built an iron house at Zion Mills weir, and we keep three men there all the year round at the cost of 100 £, about. We built another house at Mr. Scott's weir, near Omagh, and we keep five men there during the breeding season at a cost of about 80 £.

1692. Do you know any rivers or parts of rivers that have been rendered almost useless for breeding purposes by mill weirs?—I do.

1693. Will you kindly give the Committee some particulars on that head?—Yes; take the Foyle. On the Bree a man about three years ago built a weir near Dungiven. The conservators wrote him and referred him to the Act of Parliament, but he went on and built his weir, and I should say that that weir has cut off about five miles of breeding ground on the Roe. Very few fish get over it.

Mr. Macarty.

1694. What is the name of the man who built the weir?—A Mr. Fallows. The conservators wrote him and referred him to the Act of Parliament regulating the building of weirs, but he paid no attention and went on with his weir. I do not say that some fish did not get over it, but it has become a poaching trap.

Mr. Selous-Kerr.

1695. Will you kindly repeat the last answer you gave?—I said the weir was a poaching trap.

Mr. Pinkerton.

1696. How long has it been erected?—Three years.

Mr. Selous-Kerr.

1697. I was asking you what rivers or parts of rivers you knew which have been rendered useless for breeding purposes by millweirs. Will you give the Committee one or two instances within your own knowledge where these mill weirs have done these injuries?—I have already told you about the Roe and the Faghann. Over half of the Faghann is cut off, as a breeding river, by a weir at Ballyrorton, but that was done before my recollection. Then, on the Camowen, near Omagh, a former proprietor of the Mallock Mills put a wooden beam across the top of his weir. That might be 12 or 14 years ago. I have stood there for hours at the flood, and I never saw a fish get over it. The present owner is a good neighbour, and he opens his sluices and passes a few fish up the river, so that they are not lost altogether. I might add, before leaving the Foyle, that Messrs. Ballintyne's weir was raised by the father of the present owners, and would have been closed for fish-breeding purposes only that Mr. Smith, who

owns

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Mr. McDermott.

[Continued.]

Mr. Seton-Kerr—continued.

owns a mill above, took action against him for backing his water, which cost some hundreds of pounds, but it saved the fisheries. Then, on the Derg, another large tributary of the Foyle, a millowner named Taylor raised his weir, and would, I believe, have closed that river for salmon breeding, only a man named Love, higher up the stream, took action against him for flooding his land, and in that case saved the fisheries.

1698. Did he make a pass over his weir, or what?—He had to keep his weir down; he did not raise it so high that the fish were not able to get over it.

Mr. Macartney.

1698. Is that river now in the Londonderry district?—Yes.

1700. Do you return a report of it to the fishery inspectors?—No, I did not. This happened, I should say, about 12 or 14 years ago also.

Mr. Seton-Kerr.

1701. Can you give us any particulars with regard to the Blackwater?—We will now deal with the tributaries of the Bann, that is the Coleraine district. There is a large mill weir at Castle Dawson which closes the whole of the Moyola.

1702. How long has it been in existence?—Before I visited the place. It is a splendid breeding river. I have examined it frequently and never saw a salmon in it, or never heard of one getting over that weir. Then the Ballinderry, another tributary higher up, is closed by the mill weir at Cookstown, and 10 miles of that river is destroyed for breeding purposes. Then there is the Blackwater, which I might call Mr. Macartney's river, I think, which I have examined frequently. In my opinion it is a splendid river for breeding fish, but I could find no trace of fish in it, and I believe the weir in connection with the mill had shut them entirely out of it. I took 50,000 live ova from the Erne and put them in near Clogher, but I have heard nothing more about them since.

1703. Could fish pass over these weirs that you speak of?—I believe they could.

1704. And supposing such fish passes were made, the injury you speak of would be very much mitigated, would it not?—It would; but it is useless passing fish up to a river to breed if you cannot preserve the brood and pass them back to the sea again.

1706. And you say that when they come down, instead of going back over the weir, they go down the mill races?—They go down the mill races.

1706. Which takes the whole flow of the river in many cases, does it not?—In nearly every case.

1707. In cases of mill weirs that do not altogether close a river, do they injure it for spawning purposes?—Before going into that question I would like to explain this a little more particularly.

1708. Are you going back to the Blackwater?—Yes, I am going back to the waters of the Bann. I find the breeding ground lost in the 0.80.

Mr. Seton-Kerr—continued.

Mayola would be 25 miles, in the Ballinderry about 10 miles, in the Blackwater about 50 miles, and in the Upper Bann about 25 miles. Thus 90 miles of the Bann are completely destroyed for salmon-breeding purposes.

1709. By the action of those mill weirs?—Either by the mills or by dye water coming from the mills, or poisonous stuffs coming from the mills. Then, if the Maine is destroyed, as I believe it will be if this Bill passes, the whole of the tributaries of the Bann worth anything will be destroyed for breeding purposes. I was making a calculation this morning, and find that there are only 40 miles remaining in which salmon breed, and they are only mill streams, and there will not be, in time, enough fish to feed the pike.

1710. Does that complete your statement with respect to the Blackwater?—Yes, with regard to the Bann and its tributaries.

1711. In cases where weirs do not actually close the rivers, what injury do they inflict on the spawning?—They crowd the fish below the weir.

1712. Does it offer any facilities for poaching?—That is where the poaching is generally done; and the upper portions of a river are always better for breeding fish. In the upper parts of the river the young fish are free from the flax water, and they are free from the pike.

1713. Will you tell the Committee what injury crowding the fish below a weir does?—It starves the salmon and it generates disease. Salmon crowded below a weir are forced to spawn; another lot coming up overturn their beds; another lot overturn their beds, all in the season sometimes the beds are overturned four or five times. I have seen ova lie as thickly on the bed of the river under a weir as I have seen peas in a newly-sown field, and these are all lost.

1714. I think the substance of your evidence on this point is this: that about 90 miles or more of the Bann and its tributaries have been rendered useless for fishing purposes already, and that, if this Bill passes, practically the remaining tributaries of the Bann will also be destroyed?—That is my evidence, certainly. The whole Bann, one of the best fisheries in Ireland, I believe, would be completely destroyed, unquestionably.

Chairman.

1715. I should like to ask this question upon that. This Bill, as I understand it, only revokes a former Act of Parliament which required licences and gradings to be put down; that is all that this Bill alters, and therefore I do not see how it can affect the fisheries?—You will have other evidence upon that, sir.

Mr. Seton-Kerr.

1716. I wish to ask you some questions about the poaching. Poaching has been already referred to by some of Mr. Macartney's witnesses, and they have told the Committee that poaching generally does far more injury to the fishing than the existence of these mills and the turbines. I want to ask you what proportion do the acts of poaching at the mills bear to the poaching done at other parts of the rivers?—Fully a third of the prosecutions brought for poaching in the 53 Foyls

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Mr. McDERMOTT.

[Continued.]

Mr. Seton-Karr—continued.

1716. Are in connection with mills, and those are nearly all brought against mill workers.

1717. It is very hard, I suppose, to convict the mill workers of poaching?—Very hard.

1718. For what reason?—For this reason; the mill workers know when the mill has to be stopped, either for oiling or other purposes, and unless you have a man lying in wait, they have a man in the tail race, or somewhere else convenient, to take out the fish.

Mr. Pickerton.

1719. Who has a man lying in wait, the mill-owners?—No, the workers.

Mr. Seton-Karr.

1720. Do you believe it is possible for the mill-owners and the fisheries to live and thrive side by side amicably?—I do, and I think this would be the case but for the selfish disposition of some of the mill-owners. They build mill weirs regardless of the rights of the fisheries, and they turn poisonous matter into the rivers regardless of the rights of fishers or any other men.

1721. Have you seen this done?—I have.

1722. Have you seen poisonous matter turned into the rivers?—Yes; and everything having life killed for miles.

1723. You heard the evidence of Mr. Webb, I believe, who was examined before this Committee?—I did.

1724. Would you kindly tell the Committee whether you agree with him on any points, and on what points you differ from him?—I differ from him on many points. I differ from him on the point that salmon passing down the head race of a mill swim back again, and pass down the river. No man ever saw that. No man ever saw a fish, after spawning, dropping down a mill head race, going back again, and then going down the river; and no man ever will, until salmon are endowed with powers of reason.

1725. I believe when the instinct of the salmon is to go to the sea nothing stops them?—I never saw them turn.

1726. There is a certain time in the year when fry get their silver coats on, is there not?—Yes.

1727. And nothing will turn them up the river at that time, I believe?—No; they will pass down to the sea the first rise of water they can get.

1728. Taking the case of a mill race, say half-a-mile long, supposing a shoal of fry get into that race, and get towards the end where the turbine is situated, do you think it is possible that they can, under any circumstances, be induced to go back and down the river?—Certainly not. Then Mr. Webb said they were safer in the mill race. Fry hide in rivers under the stones, reeds, and bushes from their natural enemies; but if you crowd them in a mill race, what chance have they got; if he had seen, as I have seen, more pikes than one rushing through them and devouring them, he would change his mind.

Mr. Seton-Karr—continued.

1729. What you mean is, that in the mill race there is no cover for the fry?—No; the bottom is level, and the sides smooth, and there is no cover for them. I have seen fry jump high out of the water to escape, and fall back again to be eaten up.

1730. They are killed in far greater number on that account by the pike, for instance?—Yes, in those places. You see they have no cover in mill races. I should say, with regard to starving the fish below the weir, in one case on the Roe the fish came up to the weir, and the water for a week or so was drawn off by the mill race, and about 300 fish died, and had to be taken out and buried.

1731. Below the weir?—Yes, below the weir.

Mr. Hayden.

1732. For want of water?—For want of water and for want of food.

Mr. Tomlinson.

1733. Was that because they could not get over the weir?—Yes, that is the reason.

Mr. Seton-Karr.

1734. Have you attempted to erect fish passes at any mill weirs?—We have. We have several times asked owners for permission to put up fish passes. We got it from one owner once, but afterwards he took our stones away to build his weir with, and I should add that our fish pass had not touched his weir at all.

1735. And that particular fish pass has never been replaced, has it?—Yes, I replaced the fish pass again.

1736. If you had fish passes in all these weirs that you have alluded to on the Foyle and on the Bann tributaries, it would not affect the flow of the water to the mill races of the mills, would it?—No, it would not.

1737. It would not affect the mill power, would it?—No; but nearly every millowner takes every opportunity he can of adding to the height of his weir, and that is the reason why they will not, I believe, allow us to put up fish passes.

1738. Are there many turbines in your district?—No.

1739. I suppose you have often watched mill races where there are turbines, have you not?—I have been at several, but not at very many.

1740. Have you been at some?—Yes, I have.

1741. What is your opinion with regard to fry passing through turbines?—I think fry passing through a turbine would not be easily got.

1742. Do you think they would be killed?—I have always had the opinion that there is nothing sorer than that they would be killed. The fish are about the same specific gravity as the water, and if they are killed they are swept through, and are not seen. In the case of the dead salmon I have referred to, they were all swept 200 yards to the very end of the tail race, and they were caught in a pool where the water from the tail race met the water from the river.

1743. That

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Mr. McDermott.

[Continued.]

Mr. Macartney.

1743. That was not in a case of a turbine wheel, was it?—No.

Mr. Seton-Karr.

1744. It is very difficult indeed to find the dead bodies of fry that may have been killed in a turbine, is it not?—I should say it was almost impossible.

1745. One of the witnesses produced some pieces of wood and pieces of turnip the size of fry, which had been passed through a turbine, and showed no marks of any kind; do you think, from your knowledge and experience of the habits of fish, and the way they swim, that that is a reliable test of whether turbines inflict injury on fry or not?—I do not think it is. The sticks and the turnips are inert substances, but when a fish feels itself in a swirl it is sure to swim against the stream as much as possible, and the next huckles comes round and hits it.

1746. The turnips and wood have no life, and float where the water carries them, and the fry, of course, swimming against the water, would be much more liable to injury?—That is what I mean.

1747. I suppose you might just as well argue that because a piece of wood the size of a salmon went over the Falls of Niagara without a mark, therefore a salmon could go over the Falls of Niagara without being injured?—And I would say that a blow that would kill a fry would leave no mark whatever on a piece of wood or a turnip.

Mr. Pinkerton.

1748. A turnip is very soft, is it not?—But a fry is much softer still; you can just touch it with your fingers and squeeze it all to pieces.

Mr. Seton-Karr.

1749. Have you some fry in your hand?—I have, but they are not in a very good condition; they were sent by post, and they are all dried up.

1750. Are those fry that have gone through anything?—No.

1751. Those are fry that are on their way to the sea, I suppose?—Yes; you can see that that is as soft and as tender as possible; it is not like a turnip or a stick. (*The witness produced some salmon fry.*)

1752. Of course, when they found themselves in the rush of a turbine wheel, they would naturally swim a little against the stream?—Undoubtedly.

1753. Some of the witnesses have said in evidence that they would be very glad to give all facilities for protecting fish, provided their own position was not affected. I wish to ask you this: Will you tell the Committee how mills are generally established on a river?—When a man wants to build a mill he looks out for a piece of a river that will give him a fall of, say, 3 feet in half a mile. He cuts his watercourse, and builds his mill, and he finds 3 feet is not sufficient fall, and he goes into the river and builds a weir, which may be 6 feet high, more or less. He never thinks of making provision for passing the salmon over his weir, or making any provision to prevent the salmon fry getting into his works and getting killed.

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Chairman.

1754. Are there any mills recently constructed in any of these rivers?—I am telling you now of cases that I know.

Mr. Macartney.

1755. How recent?—One is within the last 10 years, and another within the last eight or nine years.

1756. Where are they?—One is on the Colebrook River, county Fermanagh.

Mr. Seton-Karr.

1757. In order to work his mill, the owner has found it necessary to build a weir; is that so?—Yes.

Mr. Macartney.

1758. Do you say salmon spawn up there?—Yes.

1759. You do?—I do, certainly. I have seen them at Tempe, on the river. The case on the Colebrook River is this. A man built his weir 2 feet high. I took Mr. Johnson, one of the inspectors, to see it, and he said 2 feet would not do any harm. I thought the same, and the man promised not to build it any higher, but I find he has built it 6 feet high, adding to it year by year.

1760. What mill is that in connection with?—The man is named Gilliland, and he lives in the townland of Crough.

Mr. Seton-Karr.

1761. Then you say that the millowners, in putting up the original construction of their mills within the last eight or ten years, have never given any facilities for the protection of the fish?—They never think of the fish.

1762. What protections would you suggest, under those circumstances, for the fish?—The law provides that they should submit plans to the inspectors of Irish fisheries, and have them approved, but the law imposes no penalty for non-compliance. Therefore, I say the plans should be submitted to the inspectors for approval, and that there should be a sufficient penalty attached to compel a man to carry out his works according to his plans.

1763. What experience have you had in putting up gratings?—I am constructing a large fish hatchery on the Foyle. I have got there a canal half-a-mile long and 13 feet wide. I first laid a heavy metal sill across the bottom of the canal from bank to bank. I then set up four heavy metal castings, like double-headed railway bars strongly bolted to the sill; I put another bar across the top, and then I formed a frame of three spaces, and down that I intend to drop my gratings. The cost of the metal frames was £4, and the gratings are estimated to cost about the same; I understand that this canal, which I have cut, is about the same width as Mr. Webb's works, which he says would cost £4,000.

1764. What is the purpose of these gratings?—They are for the purpose of keeping salmon for fish hatching, enclosing salmon for fish hatching.

1765. Is there much of a current down your canal?—Just about the same as there would be in a mill race.

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1766. How

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[Continued.]

Mr. Macartney.

1766. How many feet per minute is it?—Well, I did not calculate how many feet per minute.

1767. It varies in mill races, does it not?—Yes; I am taking an ordinary mill race.

Mr. Seton-Karr.

1768. It must be a pretty fair current to keep salmon alive, and in condition, must it not?—Yes, it is pretty good; I have a fall of 9 feet 6 inches in half-a-mile.

1769. I think an ordinary fall for a mill race is between 7 and 15 feet, is it not? I think one of the witnesses said that?—They can work with that, but they would rather have more.

1770. I think Mr. Webb's mill race has not much more than 9 feet fall, has it?—I think one is 9 feet and the other 12 feet; a millowner would take 60 feet if he could get it.

1771. Do you have much trouble in keeping your gratings clean?—They are not in position yet, I have only got a metal frame in.

Mr. Macartney.

1772. You say there is only the metal frame in?—That is all.

1773. There is nothing else impeding the flow of the water clean?—There is nothing else; it is the cost I am dealing with.

Mr. Seton-Karr.

1774. You do not anticipate any trouble in keeping these gratings clean, do you?—I do not.

1775. What kind of gratings, in your opinion, could be put up in front of turbines as fry guards without injuring the flow of the water?—

I went to Sir James Mathland's place, near Stirling, in Scotland, some time ago, and I saw what he calls a leaf screen there. That is a frame like the broad part of this table, with perforated zinc on the top. It is set at an angle of about 10 degrees to the horizon, and the water flows over it, and he says he has no trouble at all with it.

1776. Is that an efficient fry guard in his case?—It is much closer than any fry guard will be. It is only perforated zinc, and the holes not so much as one-eighth of an inch in diameter.

1777. What kind of a mill is there there?—There is no mill there. It is there for fish-hatching purposes. It is to keep leaves and other debris from getting into his place.

1778. Can you describe to the Committee any kind of grating which you think would act as a fry guard in front of a turbine wheel without interfering with the flow of the water?—I think you will have to leave that to engineers.

1779. You are not prepared to say anything about that?—No.

Mr. O'Neill.

1780. What kind of a screen did you say Sir James Mathland had?—A leaf screen.

Mr. Seton-Karr.

1781. Have you read Mr. Macartney's Bill?—I have.

1782. What do you think would be the effect of it from your point of view?—I really think it would ruin the fisheries.

1783. Can you give us some reason for that?

Mr. Seton-Karr—continued.

—I always believed that salmon fry passing through a turbine were killed. I know that large salmon passing through many wheels are killed.

1784. And with the present arrangement of weirs, and unprotected turbines, and mill races, is it your opinion that all fry and salmon descending the river must get into the mill races, and the fry must pass through the turbines?—That is so. It is not only the case, but salmon getting high up a river have to pass through 8 or 10 turbines, it may be, before they get to the sea again.

Mr. Macartney.

1785. Before they are killed, do you mean?—Dead or alive.

Mr. Seton-Karr.

1786. Would they be probably killed in the first one?—They might.

1787. And their dead bodies be washed down through the remaining six or seven; is that what you mean?—What I mean is this: supposing they did pass through the first turbine, they would have to pass through a second; supposing they passed through a second, they would have to pass through a third, and so on in the end.

Mr. Macartney.

1788. And sometimes there are, how many turbines to pass, do you say?—Eight or ten.

1789. And then they happily arrive at the sea, I suppose?—Yes, but I do not think they pass through the first.

Mr. Seton-Karr.

1790. If by any extraordinary chance they passed alive through the first turbine they would have to go on running the same risk seven or eight times, whatever the risk was?—That is so.

1791. Supposing that bye-washes were made in these mill races, and that traps could be devised which would set as fish and fry guards in front of the turbines, and at night the mills were stopped working and the bye-washes opened, and the fish allowed to go down, would that, you think, be an efficient protection for the fish in these mill races?—I think it would be of very great use.

1792. What they want is more means to get out without passing through the turbine?—Yes, that is so. They want to get out above the mill wheel.

1793. And it would not be a very costly work to make these bye-washes and open them regularly at night, when the mill was not working, I suppose?—I do not think it would.

1794. It is quite clear, I take it, under Section 4 of this Bill, if it were passed into law, that there would be nothing here to enable the board of conservators to take any means to protect the mill races, or protect the fish?—The millowners are so jealous of the rights that they have got in some way or other, that they will not let the conservators touch them if they can avoid it.

1795. I am alluding to the last two lines of Section 4 of this Bill, in which it says that, "nor shall authorise any grating to be placed

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Mr. Selva Kerr—continued.

so as to interfere with the effective working of any mill." The effect of that would be that the conservators would be powerless to put up any protection whatever in a mill race, would it not?—They would. The evidence of the millowners here was that they would not appoint any man to be the judge. They would be the judges themselves, I suppose.

1796. I understand you to say that your construction of these laws is, that the board of conservators are powerless to put any protection whatever for their fish in those mill races?—That is so.

Mr. Pinkerton.

1797. Are you an engineer?—No.

1798. I was not in the room when you began to give your evidence; what is your profession?—I have been connected with the fisheries all my life, for over 25 years.

1799. You are an inspector of fisheries, I believe?—Yes.

1800. Have you read this Bill?—I have.

1801. What part of this Bill deals with the question of weirs?—Section 4.

1802. Read the passage, please?—"Any board of conservators, after due notice to the owner or occupier of any mill or other premises at the expense of such board, during such period as may be prescribed in each year, may order to be placed in any watercourse, mill race, cut, sluice."

1803. That is with regard to the gratings. I am talking about the weirs across the beds of rivers; what part of the Bill deals with that?—I do not say it deals with it at all.

1804. You say according to the existing law you have no power to interfere with the erection of weirs across beds of rivers?—That is my opinion.

1805. Yet, if this Bill became law, the millowners would be compelled to grant you powers to put in safeguards to protect the fish, would they not?—I do not think they would.

1806. Do you not think so under this Bill; you evidently have not read the Bill?—I have, indeed.

1807. This Bill grants powers to the owners of fisheries to erect at their own cost any safeguard that may not have the effect of interrupting the flow of water, does it not?—Yes; go on, there is something else. Who is to be the judge of that?

1808. The ordinary judges, should this become the law of the land. Your evidence is to the effect that millowners are nothing short of a public nuisance, is it not?—I think millowners have taken rights which they have no right to take.

1808*. What is your solution of the problem?—My solution of the problem is, that when a millowner diverts a river for his own purpose he should preserve the fish in the river.

1809. How is he to preserve the fish in the river?—By keeping them out of his works.

1810. But that does not deal with the question raised by your evidence, which is the question of weirs across the river. That does not affect the intake of the tail race, or anything of that kind, does it?—If a millowner makes a cut in the river and takes in the water, and takes in the

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Mr. Pinkerton—continued.

fish and kills the fish, or if he takes in the water pure, and sends it out poisoned—

1811. This Bill does not deal with the poisoning of rivers at all?—I thought it dealt with all those things.

1812. It does not deal with that at all?—That is my opinion of what it should be. I do not know what to say about this Bill at all. I think it is a bit of patching, and the whole thing should be taken up and dealt with on a broad basis, taking in all the interests concerned and protecting them.

1813. You mentioned the tributaries of the River Foyle, and said those streams would be damaged in the same way as the Bann had been damaged. Can you explain to me where the Bann has been damaged by the erection of turbine wheels?—I did not say the Bann had been damaged by turbine wheels.

1814. You said it was damaged, did you not?—I said it was damaged by mills and factories.

1815. Do you know the River Bann below Coleraine?—I do.

1816. You are aware that the owner of the fishery there has power to erect nets right across the river, has he not?—Not to erect nets right across the river.

1817. To fix nets?—Yes, he has a right to fix nets across the river.

1818. From shore to shore?—From shore to shore.

1819. Preventing the fish going up the river?—That is at duly stated times.

1820. In your opinion, is not that more calculated to injure the fisheries on the Bann than all the machinery on the river?—I do not think so.

1821. Why?—Because it has been fished in that way from time immemorial.

1822. Then you think it is better to continue to do a stupid thing which has been done before, I suppose?—No change came into the fisheries till of late years. I do not know about the stupid thing at all.

1823. You also stated, did you not, that the mill workers were the greatest poachers?—In connection with the mills I did.

1824. Is it not an undoubted fact that every millowner takes the greatest possible precautions to prevent any of his hands poaching?—It is not; but I must say some of them do. A millowner gave evidence here, saying he saw fish taken off his own weir, and he did not report it.

1825. Do you object to the evidence of Mr. Webb with regard to the cost of the erection of that safeguard he spoke about?—I do, entirely.

1826. And do you state that the expense incurred by you in putting a safeguard across this hatching bed of yours was only 14 l.?—I say the frame with the gratings cost 7 l., and I say the gratings I estimate to cost about the same amount.

1827. Then, according to that evidence, Mr. Webb has over-estimated the matter by something like 1,400 l.?—He has over-estimated it 1,200 l. or 1,300 l. any way.

1828. You heard Mr. Webb give evidence to the effect, did you not, that he had consulted engineers in this matter?—I did.

1829. But, in your opinion, you know more than

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Mr. Pinkerton—continued.

then any engineer, do you?—My opinion is that that is a wild estimate.

1830. Do you think your evidence on this matter is more reliable than that of a professional man?—I have not heard a professional man's evidence on it.

1831. Did you hear Mr. Webb distinctly state that he had estimates from professional men?—He did; but other people can form opinions as well as Mr. Webb.

1832. And you think you are as well qualified to judge as any professional engineer, do you?—If I had a professional engineer's evidence here I would deal with it.

1833. You are paying Mr. Webb a compliment by not believing that he had the evidence of a professional man, are you?—I pay him the compliment of doubting the estimate, any way; I might say such an estimate is simply absurd for doing such a work.

1834. Supposing you prevent the millowners constructing these weirs across the river, what would be the effect of that?—There would be far more salmon for those who eat them.

1835. Would that tend to develop the trade of the country?—It would tend to develop the fisheries of the country.

1836. Can you give any estimate with regard to the annual value of Irish fisheries?—You will have that proved before you; but I understand the exports of salmon from Ireland as worth about 600,000 £. per year; but I am not prepared of my own knowledge to tell you; you will have that proved.

1837. Have you heard evidence given with regard to the turnover in connection with the mills affected by this Bill?—I have.

1838. And, in your opinion, I suppose the milling interest is rather a minor interest, is it?—No, I do not think so.

1839. You are desirous of seeing the millowners hampered and handicapped, are you?—It is not my desire.

1840. How can you possibly carry out your regulations without hampering them?—Right well.

1841. Will you explain it?—If the millowners were reasonable men they could live and thrive, and so could we beside them.

1842. Tell us how?—When they build a mill weir they should put a pass into it, and when they cut a canal or mill race they should put a grating on it, and I would say they should put a bye-wash, and when the mill is not worked they should turn the fish back again. They should also make a settling pool, and not turn their poisonous dye stuff into the river.

1843. Dye stuff has nothing to do with turbine wheels, has it?—But you asked me about the mill industries generally.

1844. A grating will not prevent dye stuffs from getting into the river, will it?—They should prevent dye stuffs from getting into the river by making a settling pool, but they will do nothing.

Mr. Tomlinson.

1845. Your evidence in substance is, that apart from turbine wheels there are a great

Mr. Tomlinson—continued.

many causes which do injury to fish, is it not?—That is so.

Mr. Pinkerton.

1846. According to your evidence turbine wheels do not affect the fish to any great extent?—I am not prepared to deal with turbine wheels; I only deal with things I know of.

1847. Your evidence has dealt so far with what is outside the scope of inquiry, then?—I do not think it should be. On the other side, you inquired into Canadian weed, and flax water, and a great many other things.

Mr. Selous-Kerr.

1848. And also poaching and drainage?—Yes, poaching and drainage.

Mr. Pinkerton.

1849. Have you ever seen fry after passing through turbine wheels?—No; I told you I never did. I never looked for them.

1850. You have talked about salmon going down a mill race and not being able to turn; did you ever see salmon going down a mill race?—I have counted those 50 an hour.

1851. Did you see them after passing through?—I did, after passing through the byewash.

1852. Was it a turbine wheel in that case?—No; it was a bucket wheel; they did not go through the wheel.

1853. You mentioned Sir James McIntosh's place, and the leaf screen; supposing that that leaf screen had been erected at a place where there were several mills above it, what would have been the result; supposing that on that very stream there were five or six mills higher up, what would you say as to keeping it clean?—What harm could the mills above do to a leaf screen below?

1854. Take the scotch mills, for example; the refuse floating down from a scotch mill would be more liable to clog that screen than ordinary leaves, would it not?—Are you referring to that fry guard which has been produced here?

1855. Yes?—If that fry guard had been put up to protect a turbine, the owner of that turbine would soon compel the man above to keep his wool to himself; he would not allow it to come down and choke his grating. Those actions which I have mentioned plainly prove that.

1856. How can the man keep his wool to himself?—He would have to provide some means of preventing it getting down to injure his neighbour below, or he would be in the Court of Queen's Bench in 24 hours.

1857. Are you of opinion that any additional expense in doing these things should be put on the millowners?—Certainly.

1858. What benefit do the millowners reap from the fisheries?—The millowner has built up our rivers, and poisoned them, and has added 25 per cent. to his water power. A man who was earning 1,000 £. last year earns 1,250 £. this year, and ought to bear some portion of the expense.

1859. Then, is it your contention that the rivers of a country should be used as happy hunting grounds for a privileged class?—You have not studied the matter properly; go you round the coast, and see the hundreds and thousands

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Mr. Pinkerton—continued.

sons of men living there by fishing; I do not think that industry should be strangled at all, but I think that we should have a fair protection, and so should all those poor men who live by fishing in the deep sea; you have not looked at the matter in all its breadth, I am afraid.

Mr. Haylen.

1860. You say, do you not, that the weirs are raised unduly by millowners?—I do.

1861. Do they not render themselves liable to a penalty for that?—No.

1862. Are there not prescribed limits for the height of a weir?—No.

1863. With regard to the grating, would a grating at the end of the tail race be as effective as close to the mill?—If a grating is to be erected at a tail race at all it should be at the very end of it.

1864. At the entrance to the main river do you mean?—Where the tail race discharges into the river is where it should be. But if it is to be put at the head race it might be put behind the wheel with a bye-wheel to allow the fish to get out.

Mr. Macartney.

1865. You do not come here to give evidence, especially with regard to turbines, do you?—No.

1868. You have no personal knowledge of the effect of turbines, have you?—No, I have never looked for fish killed by turbines.

1867. Does your evidence deal generally with the effect of the ordinary water wheel?—It deals generally with the effect of mills.

1866. I am talking about water wheels now; I know you have gone into a general question, but your evidence before the Committee to-day deals with the effect of the ordinary water wheel on the destruction of salmon?—Yes.

1869. And you say, do you not, that has had a very important effect in diminishing salmon in the rivers that are under your conservancy board?—I would not say very important.

1870. Is it material or immaterial?—It is material in some cases.

1871. Has it contributed 5 per cent. to the destruction of fish or not?—I could not go into figures.

1872. Would you be prepared to tell the Committee it has contributed 5 per cent., or not, in the destruction of fish in the river under your conservancy board?—I would not put it into figures.

1873. I want you to answer my question; you have come here to speak as to the destruction of fish by water wheels, and I want to know if you will tell the Committee that, in your opinion, the destruction of fish resulting from the use of ordinary water wheels is above or under 5 per cent.?—No, I cannot give any opinion.

1874. You will not give any opinion?—No, and I will tell you the reason if you like. My reason is that we never see any proportion of the fish killed by wheels.

1875. Then how do you form any opinion as to whether they are killed by wheels or not?—We form an opinion by what we get and what we see. Often fish are caught below wheels of 0.80.

Mr. Macartney—continued.

which there is no note kept. In fact, these notes I gave you were not intended for any inquiry of this kind. It was altogether for another purpose, which I will tell you. At the time I took these notes there was a great controversy over what fish fed on, and I had all those fish opened and examined to see what they fed on; it was not for any purposes of this kind.

1876. It does not matter what purpose it was for; your evidence would be equally valuable. What I want to know is this: you say a certain number of fish have been found which you state have been killed by mill wheels?—Yes.

1877. Do you wish the Committee to understand from you that water wheels have contributed largely or not to the destruction of fish in the rivers in your conservancy district?—I could not say largely.

1878. Could you say it was as much as five per cent.?—If you take the actual killing of fish by wheels I would not say that, but if you take the actual loss of fish by wheels, weirs, and fish killed in connection with mills, I would say it was nearly 30 per cent.

1879. But you are not prepared to say in your opinion that the loss caused by water wheels amongst fish does or does not amount to 5 per cent.?—I would not give an opinion on the percentage.

1880. Will you say that it is more, or less?—I would rather say more than less.

1881. It is more than 5 per cent., you say?—I would rather say more than less.

1882. It is not more than 10 per cent., is it?—There is no man who could form a proper opinion.

1883. Then why do you say 5 per cent. You come here as an expert; you are an inspector of fisheries called to give evidence on the question of the destruction of fish, and you have now asserted before the Committee quite a new point, namely, that water wheels are destructive?—Because I have had fish killed by the water wheels. But then, remember, we do not get anything like the number of fish that are killed, because if our bailiff does not get into the mill-race when the mill stops they are picked out. In fact, on Monday week last our bailiff caught a basket-maker with the fish that he had taken out of the mill-race tied up with his bundle of reeds.

1884. Do you say those fish were killed by the water wheel?—The bailiff said they were. I did not see them.

1885. You come here as an expert to speak as to the damage done by water wheels in your own conservancy district, and I want you to direct your attention to that. I want you to give the Committee your idea. Is it above or under 5 per cent.?—I said I would rather put it above than under; but I would rather you did not ask me.

1886. It is not very much above five per cent., is it?—I have said it is impossible to tell, unless I could count the whole number of fish.

1887. Then so what data do you come here to give evidence of material damage to fish? Do you say 5 per cent. out of the total damage is material or not?—Very material.

1888. Then in your opinion the 5 per cent. of damage

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[Continued.]

Mr. Macartney—continued.

damage that is done to the rivers in your conservancy district would require special legislation dealing with the water wheels, and the other 95 per cent. you do not slink much off?—I think there should not be 1 per cent. damage done if it could be prevented.

1888. Can you prevent 1 per cent. of damage being done?—I believe so.

1890. How?—By protecting the fish about the mills.

1891. Can you suggest to the Committee how one per cent. of damage to salmon fisheries could be prevented in any way which would enable the owners of the water wheels, who are a very large number of people, and carrying on a very extensive business, carrying on their work. Will you suggest anything to the Committee now?—I think the owners could very well put up gratings to keep fish out, and it would not do them one bit of harm.

1892. Have you not power now to insist on gratings being put up at head and tail races?—We have.

1893. Have you exerted that power?—No; very rarely.

1894. Why have you not?—We tried to several times, and we found it very difficult to exert it.

1895. What do you mean by difficult?—We proceeded against one millowner, and the inspectors came down and refused to give an exemption. Then he put in a plea that he was not the owner of the land at the head-race, and that he could not get permission from the owner of the land to put up his grating, and the proceedings fell through.

1896. Is that the only case in your experience in which your conservancy board attempted to put these gratings up at ordinary water wheels?—There were several others, but I could not give the particulars to you now.

1897. As a matter of fact you have full powers to insist on head and tail gratings being put on water wheels, have you not?—We have.

1898. And you have never exercised them, have you?—Not very much.

1899. You do not exercise them, do you?—Not very much.

1900. Have you got them on anywhere now?—Practically no; some of them are on, but they are so bent and twisted that they are practically useless.

1901. And the conservancy board submit to the 5 per cent. loss sooner than enforce a law which they can enforce, do they?—They have to submit to far more than that.

1902. That is your answer with regard to this particular thing, is it not?—It is.

1903. You admit, I think, that the flax water does great injury to fish?—Yes, it does. I have seen fish killed by flax water.

1904. And, I think, you stated to the Committee that these weirs or dams prevented the fish having access to the upper reaches of the river?—So I say.

1905. You speak of the River Blackwater?—Yes.

1906. Would there be any advantage in taking

Mr. Macartney—continued.

up the dams or weirs on the Blackwater?—I think there would.

1907. Will you tell me what upper reach of the Blackwater there is in which there is no flax water?—I do not think there is any reach of any river altogether free from flax water.

1908. There is flax water in all the rivers round there. They are in one of the centres of the trade, are they not?—The further up you get, the less you get.

1909. Is there not a sufficient quantity (taking the Blackwater) of flax water in it to kill all the fish nearly?—That depends on the season. Last year we had such a fortunate succession of floods during the flax water season that the flax water did not do so much harm. Other seasons we are not so lucky, and the fish are killed.

1910. I may take it from you that flax water really permeates the whole stream right up, does it not?—Yes, more or less, but we sometimes escape it.

1911. Do you admit there is considerable poaching?—Yes, we have some poaching, but not so much as before.

1912. How many prosecutions have you had?—I could not tell you how many prosecutions we have had. We have on an average on the Foyle, I think, about 40 in the year.

1913. You say that poaching goes on in the mill-races?—I do.

1914. Does it go on in Mr. Herdman's mill-race?—Not as far as they can prevent it.

1915. They do try to prevent it, do they?—They do.

1916. There is poaching there, you say?—Yes.

1917. To a considerable extent?—It is always the case where there are a great number of workers gathered together.

1918. Do you wish the Committee to understand that the millowners take no steps to prevent poaching in their mill-races on the Foyle?—I think they are very sly.

1919. They let it go on, do they?—A good many of them do.

1920. Do the majority of them let it go on?—The more respectable of them do not let it go on. I could tell you of some who would not allow it. Mr. Scott would not let it go on if he could help it.

1921. Then there are some millowners who are not respectable, you think?—There are some who are not so conscientious as others.

1922. I want to call your attention to some evidence you gave about Mr. Webb. You said that he had said something about seeing salmon in his mill-race, which you doubted?—Yes.

1923. I will draw your attention to the fact that Mr. Webb never said that he had seen full-grown salmon in his mill-race, but that he had seen fry. Now, you said in evidence that in your opinion it would be impossible for fry to get through a turbine, because they would immediately turn against the full rush of the stream?—Yes.

1924. The full rush of the stream feeding a turbine would be felt before they got into the turbine, would it not?—It would, but not before it got into the pipe leading to the turbine.

1895. Have

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Mr. McDermott.

[Continued.]

Mr. Mucertsey—continued.

1925. Have you much knowledge of turbines?
—No, but I have seen them.

1926. Have you much knowledge of turbines?
—I have seen drawings of turbines.

1927. Have you ever seen them in operation?
—I have never seen a turbine working.

1928. Have you ever seen the water go into the pipe of a turbine?—I have not, but I have had it described to me.

1929. Then I will not ask you anything more about that. With regard to the question of the amount which Mr. Webb stated it would cost him to put up the lattices, gratings, and other erections he was called upon to fix by the conservators, you say it was an absurd sum, do you?
—I do.

1930. Do you know Mr. Wilson, the civil engineer, by reputation at all?—I never knew him until I saw him here.

1931. Do you know him by reputation?—No.

1932. You do not know what position he holds in the profession?—I do not.

1933. And are you prepared to say that his estimate is absolutely absurd?—I do say so.

1934. Have you had any experience of erecting walls under water, or laying foundations under water?—I have.

1935. Where?—On the Foyle.

1936. At what point?—I have put up as I told you these guides for these gratings near Newton Stewart.

1937. How many cubic feet of masonry under water, was there?—I shut the water off. We expect to have nine feet of water when we turn it on.

1938. How many cubic feet of masonry was there altogether?—Many cubic yards.

1939. Cannot you give me any definite idea of how many there are?—No, not in connection with the gratings; I was putting up sluices at the same time, and I built the sluices along with the guides for the gratings.

1940. Are you a contractor for sluices?—No.

1941. Have you ever reported to your conservancy board the damage done by these water wheels? I suppose you do make reports?—Yes, sometimes.

1942. Have you ever reported to that effect?
—Yes, sometimes.

1943. When did you last report?—I have not reported for a good while.

1944. But how long ago was it; was it last year?—I think it was perhaps last year.

1945. Did you make a report last year?—Not a written report.

1946. Do you ever make written reports?—No, I just appear before them, and tell them.

1947. Did you say anything when you appeared before them last year about the damage done by water wheels?—I could not say last year.

1948. Did you the year before?—I might have done the year before.

1949. That was 1890, and you say then you might have, but you are not certain?—No, I am not certain.

1950. When were you first impressed with the damage done to the salmon fisheries by these

Mr. Mucertsey—continued.

water-wheels?—Since I first got connected with the fisheries.

1951. How long ago was that?—Twenty-five years ago.

1952. Did you then make a report?—It is so long ago that I could not tell, but it has been often talked over.

1953. Have you kept continually pressing this matter on the conservancy board?—It has often been brought before them and discussed.

1954. By you?—By me and others.

1955. Have you impressed on them the injury it has been doing?—They have heard all about the injuries.

1956. Do you ever see the reports they make to the fishery inspectors?—I do always.

1957. Can you give me the date of any report of the Conservancy Board of Londonderry, in which they speak of this injury by water-wheels?
—I could not.

1958. Are you aware that they stated in their last report but one, that the general state of the Londonderry district was satisfactory?—That is right.

1959. And that considerable damage was done by flux-water?—That is right.

1960. And that offences against the fishery laws had somewhat diminished?—That is right.

1961. If there had been any other considerable damage it would probably have been mentioned in that report, would it not?—It might not.

1962. Why not?—We get tired of bringing reports before the inspectors if nothing is done.

1963. What would you expect to have done if you made a report about water-wheels?—We would expect where there is a law that it should be enforced, and we would expect where there is not a law that the inspectors would move the Legislature to make one.

1964. But there is a law at the present time, is there not?—There is.

1965. Which you can enforce, can you not. You have already told the Committee there is a law, and that you do not enforce it?—I have already told you there is a law, but we do not enforce it because it is so hedged by difficulties.

1966. What difficulties are there?—I described one of them in the particular case of the owner of a mill who said he had no power over the head-race as he could not go on the land to build a structure.

1967. Is that always the case?—Not always.

1968. Do you say that is generally the case?
—No, I do not say that it is general, but that it happens sometimes.

1969. Can you give me an instance of your having attempted to enforce this law where there are none of these special difficulties?—No, I think we have been too lenient with the mill-owners and have not been treated by them as our generosity deserved.

Mr. O'Neill.

1970. You gave some rather startling evidence about the damage that weirs do to the breeding ground. You said that at Dungiven about three years ago, a man called Fallows put up a weir
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[Continued.]

Mr. O'Neill—continued.

and cut off five miles of breeding ground?—I said partially cut it off.

1971. Did you object to that?—Yes.

1972. Did he take any notice of your objection?—No.

1973. None?—No.

1974. What steps did you take to enforce your objection?—We consulted our lawyer and he told us that we had no remedy.

1975. Then you objected without having any justification for doing so, you exceeded your powers, did you?—We drew his attention to the Act of Parliament which I can read to you if you wish. It is an Act of Parliament without a penalty.

Mr. Tomlinson.

1976. Is that 5 and 6 Victoria?—Yes, 5 and 6 Victoria, Section 63.

Mr. O'Neill.

1977. You say it cut off the breeding ground partially?—Yes, and below there is a trap for killing all the fish that can be caught, but only a few get there.

1978. If they get to it they can get over it, can they not?—Yes, that is the case; a few go over.

1979. Then the reason it does harm is not that it prevents the fish getting into the breeding ground higher up, but because they are liable to be killed below it?—Yes, and you know fish only mount a weir when the river is at a certain height; sometimes a river gets so high as to bring the fish up to the weir; but it does not get sufficiently high to let them go over it; then they are left there either to die of hunger, or as I have said, to deposit their spawn, and have it lost, or to be taken out by poachers.

1980. But is it not the case that the law requires a free pass for fish?—So I have said.

1981. Will they not go up that pass?—There is no pass made.

1982. If the law requires it is it not your business to see that that pass is made?—The law says that every builder of a weir shall construct a pass as he builds his weir, but the law puts on no penalty for non-compliance, that is so it has been read to me.

1983. There is a penalty in this Act, I think not exceeding 5*l.*, is there not?—You will have the lawyer of the board before you, and it will be a question for him to settle with you.

1984. Then what you mean to say is that you have no power to make millowners put up ladders on the weirs?—That is what I say.

1985. And you have no power to put them up yourself?—That is what I say.

1986. So that the law is absolutely useless, you say?—Yes, as far as fish passes are concerned.

1987. Are there any fish passes on your river at all?—Yes, I put up one myself, but I had to do it without touching a miller's weir.

1988. Would he have objected to your touching it?—I think he would.

1989. You did not try to?—No.

1990. What is it cut off half the breeding ground of the Faughan?—A weir.

Mr. O'Neill—continued.

1991. Have you no pass there?—No.

1992. Did you ever try to get one put up?—We got plans, but we found it would not work, and we did not put it up.

1993. Then you did not make them do what you thought was their duty according to law, did you?—We had not the power to do so.

1994. Now take the Bann; do fish go up Mayo, as far as Castle Dawson?—I believe they do.

1995. And are they stopped there?—They are stopped there. I never saw them stop there, but I have examined the river above it often. I put two bailiffs over there this year to examine it closely from Castle Dawson to the very source of the river, and they found no salmon in it.

1996. Then the weir at Castle Dawson does not stop salmon, does it?—But it destroys about 30 miles of breeding ground.

1997. But you say they do not come up to the weir at all?—No, I did not say so.

1998. I thought you said so?—No, I said they were stopped at Castle Dawson weir.

1999. Do you know that they go up as far as Castle Dawson weir?—I understand they do.

2000. Have you ever seen them there?—No, I never was there at the time the fish were running up.

2001. Is that a weir connected with a mill?—It is a mill weir owned by a gentleman named Clarke, I believe.

2002. That has been up there for a very long time, has it not?—Yes, a very long time.

2003. Could not a ladder be put there which would enable the fish to pass?—I think so.

2004. Have you never tried to get it done, or do you know that anyone ever attempted to get it done?—No.

2005. It is not in your district, is it?—Not exactly.

2006. Were you ever in that district?—Yes, I know every inch of it.

2007. Had you ever an appointment in that district?—No.

2008. You said that the fishing in the main would be destroyed if this Bill passed?—That is my opinion.

2009. You have heard all the evidence, and was it not proved by a great many millowners, as far as evidence can go, that fish were not killed by turbine wheels?—Yes, but I have a different opinion.

2010. But you have never seen them yourself, have you?—No, the day I left to come here I spoke to Mr. Brown, a mechanical engineer, in our town, who put up a turbine wheel for a man named Anderson, and asked him if any fish could pass through a turbine without being killed, and he said it was utterly impossible.

2011. But you know nothing of your own knowledge about it, do you?—No, I have never seen any killed.

Mr. Cox.

2012. With regard to mill weirs and the right of erecting salmon ladders, do you mean to say you never asked, and never prosecuted any man for not erecting a salmon ladder at his weir?—

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Mr. McDermott.

[Continued.]

Mr. Cox—continued.

We have no power to prosecute a man for not doing it.

2013. But the law says you have; according to the Statute the law compels every man to erect weirs or ladders on weirs?—I told you this case was reported; we brought it before the lawyer of the board, and he advised that we had no power, and advised us not to prosecute.

2014. You state that distinctly, do you not?—I do, distinctly.

2015. Has any such prosecution ever come under your knowledge?—No; it appears, as far as I am informed, that there is a law against building a weir without providing a pass, but that there is no penalty for non-compliance with that law.

2016. Did you ever know of a law to pass without any penalty?—It must be very absurd, but so it would appear; you will have to get the lawyer to settle that matter for you.

2017. You have stated also that you have never known of fish killed by turbine wheels?—I never saw any killed by turbine wheels.

2018. You have seen them killed by breast wheels?—I have got them dead.

2019. Do you see the grating which is in the room?—Yes.

2020. Were you in the room when the evidence about it was given?—Yes.

2021. Is it your opinion that if screens got filled up with stuff like that, that the mills would be stopped?—Certainly.

2022. Do you think so?—Yes, certainly; it would stop the flow of water.

2023. If such screens were put up at all these mills, would it not materially affect the industry of Ireland?—It would, but they put up a screen like that because it cost a few shillings, and they would not put up one that would cost 3 £ or 4 £.

2024. What is a proper screen?—Something like what I described at Sir James Maitland's, a flat frame of wood or iron, with holes bored through it and laid at an incline. When water flows over that, and anything gets on it, you can take a stiff broom now and again and sweep it, and the whole thing is clear. He says he has had it eight or ten years, and never knew it stopped by frost or flood or anything.

2025. Which do you think of most importance to the district over which you have jurisdiction, the fishing or the milling interests?—If you refer to the Foyle, I think the fishing is as valuable as the milling. If you refer to the Bann, I think the milling is more valuable than the fishing.

2026. What would you say taking all your district?—I should say the milling is the more valuable of the two.

2027. Should you say it is much more valuable?—I am not a miller, but I should think it is much more valuable. But that is the greater reason why the fisheries should be protected. Here is a strong industry crushing out a weak industry; a man with a 100 £ is crushing out a poor fellow with 10 £.

Mr. Twissian.

2028. You were asked about the river Roe, where the new weir was put up. Did you report that to your Board?—Yes.

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Mr. Twissian—continued.

2029. They took advice upon it, and decided not to take steps?—Yes.

2030. Who were you appointed by?—By the Londonderry Board of Conservators.

2031. Who do they consist of?—They consist of magistrates who pay a license duty; owners of land abutting on a river (they are *ex officio*), and then they consist of eight elected conservators, four for the lower division, and four for the upper division. They are elected by those who pay license duty on the out-divisions.

2032. What sort of income have your board at their disposal?—They have the revenue from the licenses, they have two-thirds of the fines, and they have 10 per cent. charged upon owners of fisheries of the value of 100 £ or upwards.

2033. Do you say that all riparian owners are entitled to be members of the board of conservators?—No, I did not say that at all. I say that a riparian owner who has a fishery of 100 £ or upwards is entitled to sit as a conservator *ex officio*.

2034. You were asked about Castle Dawson Weir; is that an old weir?—It is.

2035. Then whatever destruction that causes, it must have caused for a long time, must it not?—Yes.

2036. When you speak of the obstruction in the Maine, so far as the dams or weirs are obstructions, they have existed for a long time, have they not?—They have, but I am informed that a great many of them have been added to and made higher where the owners could do it with safety, from the action of another millowner above them who is very jealous and does not allow them to throw the water back upon him.

2037. There is another cause of the diminution of salmon which has been referred to, which I do not think you have alluded to, namely, the Canadian weed; what is your experience of that?—We have none in the Foyle that I know of. The Canadian weed grows in still water, and is principally got in the dense or still water in the rivers caused by the millowners' weirs.

Mr. Pinkerton.

2038. That is another offence on the part of the millowner, is it?—It is, certainly. But I never heard of Canadian weed doing salmon any injury until I came here.

2039. Do you know what Mr. Buckland's opinion was about the Canadian weed?—No, I do not.

2040. Have you ever come into contact with Mr. Buckland?—No, I never saw him.

2041. Has he not visited the rivers in that part of Ireland?—No, I never saw him; I would have been glad to see him, but I never saw him.

2042. Have you come in contact with any of the Irish fishery inspectors?—Yes.

2043. Do you consult them from time to time?—Yes, frequently.

2044. It is a matter of common observation with you, is it, that fish crowd together at the foot of weirs?—It is, in some places in thousands.

2045. Does that indicate a preference for the

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Maine

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Mr. McDermott.

[Continued.]

Mr. Fookertus—continued.

Maine river to the little streams?—I am not referring to the Maine.

2046. I mean does that indicate, on the part of the salmon, a preference for the main stream rather than the mill-race?—No, it does not, but the mill-race forms sometimes a very great proportion of the stream, and when there is a flood it brings them up to the weir, and the proportion of the fish going into a mill-race compared to what goes into the stream is very small indeed.

2047. In fact the bulk of the fish is found in the main stream of the river?—Unquestionably going up. Coming down I believe it is the reverse.

2048. Then so far as the fish going up the river are concerned, the chief remedy of this crowding would be the construction of ladders to pass them over, would it not?—Yes.

2049. Would the law as to putting up ladders in your judgment be affected in any way by this legislation, which is proposed in this Bill?—No, but I think the legislation should provide for the fish getting up to their breeding ground.

2050. In fact you do not want the law left as it is now?—No, I would rather have it better, I do not want to have it worse.

2051. Then your only objection to this measure is that it does not go far enough?—My objection is that it goes far enough the wrong road.

Mr. Thomson.

2052. You do not want to have this Bill, but you want to have a different kind of Bill; is that it?—Certainly.

Mr. Seton-Karr.

2053. Do you think the Bill is not only a bad Bill in itself, but does not deal with the whole fishery question, as it ought to do?—It does not.

2054. It only deals with one small part of it?—That is all.

2055. Mr. Macartney asked you whether you thought 5 per cent. would cover the loss of salmon going through bucket wheels. You said in your answer to me that on Monday the 21st March you saw four dead salmon, and the bailiff showed you 32 dead salmon, which had been killed by a wheel at another time?—Yes, that is in one year.

2056. You also, I think, went on to say that at this Faughan Mill you believe all or nearly all the fish coming down were killed in passing through Messrs Ballantine's Mill?—I did not say they were nearly all killed; I said they nearly all passed through the wheel, and I never knew of any that passed through alive; and then I told you about putting up the net to test the matter.

2057. Is the substance of your evidence this, that there was only one day in the week that you could actually see the bodies of the fish that were killed, and that was on Sundays when the mill was stopped?—Yes, and even then you cannot get at it every Sunday.

2058. Then it is impossible for anyone to form any accurate percentage of the fish that would be killed, is it not?—Absolutely impossible.

2059. On the other hand, I gather from your evidence that you are of opinion that a very large

Mr. Seton-Karr—continued.

number of fish are killed by those bucket wheels?—I think there are. If a tail-race is short, they are hurried into the river at once, and you never see them; if the tail-race is 200 yards long, and there is a pool at the end of the tail-race, they are swept along that 200 yards and lodge in this pool.

2060. Then at times it is quite likely, is it not, that 50 per cent. of the fish might be killed?—Certainly.

2061. And you will not bind yourself to any figure?—I will not.

Mr. Macartney.

2062. Do you desire to alter the evidence you gave to the Committee as to the destruction of fish?—In what respect?

2063. Do I understand you to say that 50 per cent. of the fish are killed?—No, I do not.

2064. Then what is your evidence?—I have described as well as I can that it is impossible to form any opinion about the exact percentage killed. In many tail-races there is such a short run from the wheel to the river, that you cannot see a fish at all; in fact they drop in at once to the river, and it is only in a tail-race which is long, like this one, that you can see them. They would be swept into the river, and I believe many are, only there is a pool at the end of it in which the dead fish lodge.

2065. Have you any opinion in your own mind as to the destruction of fish by water wheels. I will press you on this point, because you are put forward by the Conservancy Board to maintain the proposition that there is an enormous destruction of fish from ordinary water wheels (not turbine wheels) in the Londonderry district. Now what opinion in your own mind have you formed as to the amount of that destruction. Does it amount to 5 per cent. of the fish destroyed?—Well, I cannot give you an opinion as to the amount, and I am telling you the reason why I cannot.

2066. I know your reasons, but I want your evidence?—It would be wild for me to say anything.

2067. Then can you say it is one per cent. in your opinion. I am putting it very broadly, indeed?—You are.

2068. You come here as an expert to prove that there is damage?—Yes, and I am proving actual damage, as far as I know.

2069. You have proved 32 fish were got. What percentage of the fish in the river is that?—I do not think at all that 32 is anything like the number that were killed.

2070. By what process of multiplication do you get at the number that were killed?—I should have to count the fish in the river above this weir, and I would have to count the number that had escaped over falls, and had passed down to the weir; how could I form any opinion?

2071. Have you formed an opinion one way or the other?—No; I believe many are killed.

2072. You would not venture to say one per cent. is killed, would you?—You have asked me already, and I have said five per cent. I cannot say more.

2073. You are of opinion that five per cent. are killed, are you?—I said more.

2074. How

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Mr. McDERMOTT.

[Continued.]

Mr. Macartney—continued.

2074. How much more?—I cannot tell; it might be 10 or it might be 30 per cent.

2075. Do you wish the Committee to understand that it is 30 per cent.?—I do not, for I do not think it is.

2076. Do you wish the Committee to think it is 30 per cent.?—I would not say even 30 per cent.

2077. I will have a definite answer about this, because you come here as the Inspector of fisheries, and to substantiate a very serious charge against one of the most important industries in the North of Ireland. Your evidence will have weight with the Committee, and I am entitled to know what your opinion, as Inspector of fisheries, is. Either your evidence is worth something or nothing. If you wish me to understand it is worth nothing I will let you go, but if you wish the Committee to think it is worth something I must have a definite opinion?—I say my evidence is true, every word I have stated.

2078. I do not dispute that?—If the truth be not power I cannot help it. You want me to state theories, and we have had too many theories stated before this Committee already, in my opinion.

2079. But it must be a pure theory, because you say you have no exact means of knowing. In your opinion I ask you what is the percentage of loss?—I will not give you any opinion.

2080. You will not give any opinion on it at all?—I will not.

2081. You are not prepared to say it is 1 per cent.?—I will give you no opinion as regards the percentage. I have told you the number got, and I have told you it did not represent the number killed.

2082. What would be in your mind the number killed?—I cannot tell you, because if a mill-worker goes round when the river is stopped he picks the fish out. If there is a flood in the river we never see them at all.

2083. Now I will ask you, in your opinion, what is the number of salmon killed by poaching?—I could not tell you at all.

2084. You could not?—No.

2085. How many convictions have you had

Mr. Macartney—continued.

for poaching in the last year?—We had not very many last year. We had a good many cases, but failed in many of them.

Mr. Seton-Karr.

2086. No living man could tell the percentage unless he knew all the salmon that were going down the river, could he?—How could he.

2087. No living man could form a reliable opinion on the percentage killed, because he would not know how many salmon went down the river?—He could not.

Mr. Pickerton.

2088. Is not half of the fine which you get enough to induce you to keep a sharp look out for poachers?—I know what that question means. A man does not get half the fine. A man who brings a prosecution is entitled to a third of the fine, but during my 25 years service no penny of a fine ever entered my pocket. If I had a bailiff with me when I had a case a portion of the fine went to the bailiff. If I had no bailiff with me I sometimes returned my portion of the fine to the party prosecuted if I thought he was poor or needy, and if I did not give it to him I gave it away in charity.

2089. I think you misunderstood me; I put the question as going to show that you have been remiss in the discharge of your duty?—No man ever charged me with being remiss in doing my duty.

2090. If you were aware of poaching, and did not take notice, is not that being remiss?—I never was aware of poaching and did not take notice.

Mr. Tomlinson.

2091. Do you agree with the opinion of other witnesses who have been called that there has been a great diminution in the number of salmon in these rivers?—Not in the Foyle. The Foyle has got no turbine wheels, and there is not much pollution in the Foyle, but in the Bann it will be found that the diminution is fully half.

2092. In the Foyle there has been no diminution of the salmon since you have been Inspector, you say?—No, and I hope there will not be any diminution as long as I am Inspector.

Mr. EDWARD MOLES, called in; and Examined.

Mr. Seton-Karr.

2093. You come from Ballymena, I believe?—Yes.

2094. Are you a local inspector of fisheries?—Yes, for the Ballymena district.

2095. Have you any other district besides that?—No.

2096. How long have you acted in that capacity?—Nearly nine years.

2097. Who are you appointed by?—The Board of Conservators at Coleraine.

2098. What mileage of salmon-breeding river are you in charge of?—About 60 miles.

2099. On what rivers?—The river Maloe and its tributaries, viz., the Kells River, the Braide River, and the Clough River.

2100. How many weirs are there in the district you speak of?—Twenty-five.

0.80.

Mr. Seton-Karr—continued.

2101. Do they contain any fish passes or salmon ladders?—No, none.

2102. How many mills are there in your district?—I think there are about 30.

2103. How many of them have turbines?—Fifteen of them have turbines.

2104. Will you tell the Committee what is the condition of the mill races in your district with regard to gratings?—Do you mean at present?

2105. Yes, at present?—There are no gratings erected either at tail-races or head-races in my district at present, except in the case of three millowners.

2106. Will you mention them?—Mr. Joseph B. Black, of Race View, who has a grating erected at both ends. There is also Fanaghy Mills with gratings erected at the head-

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race

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Mr. MOLES.

[Continued.]

Mr. SLOW-KERR—continued.

race and tail-race, which have been kept up permanently for the last two years.

2107. You mention three mills where there were gratings; what is the third?—Mosten and Simpson's Corn Mills keep a grating at their tail-race. There are four tail races there, and they keep gratings at two of them, but I may add they got exemptions from the Inspector of Irish Fisheries, and they are only required to keep them up three months in the year, but they keep them up always, I suppose, seeing that they do no injury.

2108. Is that at the head-race or the tail-race?—At the tail-race.

2109. Are there turbines at those three mills you speak of?—There is a turbine at one of them.

2110. Which one?—At Fanaghy.

2111. And they have a grating at the head race, have they?—Yes, and keep it up permanently.

2112. Who is the owner of the property?—The property belongs to Mr. Young of Fanaghy. I believe the name of the man who carries on the business is Madden.

2113-14. I think you said there were 15 turbines in your district?—Yes.

2115. How many have been erected within the last few years?—Eight since I have been there.

2116. And of those 15 turbine wheels, only that one is protected by a grating at the head of the mill race; is that so?—Yes; but that is not a protection to the turbine; that is for protecting the large fish from getting into the works either by the head-race or the tail-race.

2117. Have those turbines any gratings close to them to prevent rubbish getting into them?—Yes; there are gratings erected immediately in front of all turbines, I presume, for the protection of the turbines.

2118. They are put up by the millowners, I suppose, to protect their own property?—Yes.

2119. What is the space between the bars?—I measured a number and found them one-inch-and-a-half apart; some of them are a little more.

2120. I suppose gratings of that kind would not prevent salmon fry from passing through and getting into the turbine wheels?—Not at all.

2121. What is the fall of water. Give the limits of the fall of water in the various mill-races?—I could not say anything as to that. I know that there are some there from six to fifteen feet, from looking at them. I have not measured them. For instance, Mr. Diarmore's, at Kells, I believe, is more than 15 feet.

2122. What would you estimate that fall to be?—I have never measured it, and could not say, but I expect it would be about 20 feet.

2123. But, as a rule, they run from about six to 15 feet fall, do they not?—Yes.

2124. Is that your estimate?—That is my estimate.

2125. Have you ever seen fish in the mill-races near the turbines?—Do you mean large fish or salmon fry.

2126. Both salmon and fry?—I have seen both.

Mr. SLOW-KERR—continued.

2127. Close to the grating?—Yes, at the head-race.

2128. Have you seen them in large numbers?—I have seen the small fish in large numbers.

2129. You have seen the fry in large numbers, have you?—Yes.

2130. Have you ever seen any young salmon dead?—Yes.

2131. Under what circumstances?—I got them on two occasions at Mr. Webb's works at Bauldstown when the works were turned off. I lifted five, about five or six perches from where the turbine works, and on another occasion I brought three away, but there were considerably more there.

2132. Were they fry that had gone through the turbine and been killed by the turbine?—I have no hesitation in saying they were killed by the turbine.

2133. What marks had they upon them?—They were squeezed and bent a little.

2134. It takes very little to kill them. I suppose the least blow will do it?—When I have been angling, and have hooked one, I have found they have been killed by the slightest blow, before I could take them off the hook to return them to the river.

2135. Are they delicate fish?—They are delicate fish.

2136. Do you know of any other places where they have been killed?—At Harpinstown, at a place belonging to Messrs. Frazer's.

2137. I suppose a great many fry might be killed, in your opinion, by the turbine, whose bodies you would never see?—It is impossible to see them. When the machinery is at work and they come past the turbine, the water is running at such a rate from the tail-race that with the whirl of the water and the foam that is upon it, it is impossible to see them unless the water is turned off. You might run a chance of seeing one, but they might be passing in hundreds and thousands, and you might not see one even when looking for them.

2138. They would get carried down the tail-race into the river, and you would never see them, is that what you mean?—That is true.

2139. Have you ever seen any large salmon killed?—Yes; by bucket wheels, I have.

2140. Can you tell the Committee under what circumstances you have seen them?—I have got them at Mr. Joseph Blake's mills, a considerable distance down the tail-race. On the 22nd December last I got five out of Mr. Blake's tail-race.

2141. Were they large salmon?—Yes; the reason I got them was that he has a grating at his tail-race, so when they passed over the water-wheel, the grating stopped them, and they could not get out. The fish coming down after having spawned, can get down the head-race and over his water-wheel, and when they get to the tail-race they cannot get through, so that when the water was turned off they were lying high and dry at the bottom.

2142. Had they come down by the bye-wash into the tail-race?—They had come out of the river, down the head-race, over the wheel, and into the tail-race.

2143. They

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Mr. MOLES.

[Continued.]

Mr. *Seton-Karr*—continued.

2143. They had been killed by the wheel and lay against the grating at the foot of the tail-race?—One of them was doubled over. They got knocked by the wheel.

2144. Have you seen many fish killed in that way?—Yes. At all the mills I have seen them. I have got them at another mill; a flax mill belonging to a man named Gaston.

2145. I suppose it is not possible for a man to give any accurate estimate of the number of salmon that are killed in that way?—He could not.

2146. In your opinion are there many salmon killed in that way?—A great many killed in that way.

2147. I suppose where there is no grating at the foot of the tail-race a great many dead salmon would be washed away, and you would never see them?—Well, you see, there are no gratings at any of the mills but those three I spoke of.

2148. Salmon killed by bucket wheels would not necessarily be seen, would they?—Quite so.

2149. But it is the fact, is it not, that where you have a grating it stops them, and you find the dead salmon, which proves, in your opinion, that numbers of salmon must be killed?—Yes, that is so.

2150. Have you ever known turbines stopped by eels or fish?—Yes. I was at Harpinstown Mill, belonging to Fraser's, about three years ago, and I can recollect that the place was stopped while they were taking an eel out of the turbine. I was there and saw the eel immediately it was taken out.

2151. Was the eel dead or alive?—It was living.

Mr. *Pickerton*.

2152. Do I understand you to say that the eel stopped the wheel?—It did; or, at least, the men told me so.

Mr. *Seton-Karr*.

2153. Did you see the eel?—I did.

2154. Was it injured at all?—It was.

2155. Where?—There were indentations on it here and there.

2156. It takes a great deal to kill an eel, does it not?—It does.

2157. And a salmon fry, on the other hand, would be very easily killed, would it not?—Yes.

2158. Do you think it is possible that many fry could pass through a turbine wheel revolving at the ordinary rate of speed without injury?—From the rate of speed which I have heard stated, I think it would be impossible for them to pass through, seeing that they go down a large pipe, and the force of water going down is great.

2159. Have you seen them working?—It is impossible to see; they are down under the water, but I have seen the machinery.

2160. You are familiar with the turbine wheel, and know exactly what it is, do you not?—I have been on the spot when they were being put up. I had seen them before they were put up, and I have seen them at railway stations.

2161. One of the witnesses called here produced pieces of wood and turnip which were sent through a turbine wheel and had no marks upon them; do

Mr. *Seton-Karr*—continued.

you think that proves that fry could go through a turbine in the same way without injury?—No, I think it would not prove it, because the wood or any other matter carried in will go along with the current and offer no resistance where the fish do offer resistance. I have seen them in the rivers.

2162. That would make all the difference, would it not?—I expect so.

2163. In what months do the fry come down chiefly?—March, April, and May, and I have seen them early in June also.

2164. Are those the times that the turbines are required to be protected?—That is so.

2165. At that time of the year, by-the-bye, the mill races are taking the whole flow of the river, are they not?—The water is generally lower at that season than any other season in the year.

2166. If fry get into a mill-race on the way down to the sea, do you think it is possible for them to turn up the race, and then down the river and over the weir?—I have seen hundreds and thousands, and never saw them coming up the head-race.

2167. I suppose their instinct is so strong to get to the sea that nothing will turn them back?—I believe they are all like sheep, and they will pass all resistance.

2168. That is at the time they are descending to the sea?—That is my opinion; I have never seen it otherwise.

2169. And if there is no bye-wash, then they must necessarily go through the turbine, must they not?—Yes. If there is no way of escaping they must follow the water.

2170. If there are six or eight turbines on the river, it means that they must go through all of them on their way down to the sea; is that so?—I do not understand that question.

2171. We have been told that in one river there are six or eight turbines, one below another, so that the fry entering the mill-race where there is no bye-wash must, before they can get to the sea, pass through every one of those turbines?—Just so; and the great danger is, if they do pass over the head-race they have the risk to run of one of the next works, and the next and the next, and so on, till they get to the sea.

2172. And what chance do you think there is of any fry going through a succession of turbines of that kind, and coming out alive at the other end?—I am thoroughly convinced that the chance is very small.

2173. To put it in sporting language, do you think it is 50 to 1 against any of them coming through alive?—Are you speaking of smolt fish?

2174. Yes?—I do.

2175. It is very long odds against their getting through alive, is it?—Very long odds.

2176. You have heard Mr. McDermott's evidence on that point?—I have.

2177. Do you agree with everything he said?—With reference to the smolt fish?

2178. Yes?—I do.

2179. Have the number of salmon decreased in your district during the last few years?—Considerably during the last six years.

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2180. Will

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Mr. MOLES.

[Continued]

Mr. Seton Karr—continued.

2180. Will you mention what, in your opinion, are the reasons?—Yes. I believe, firstly, it is owing to the number of small fish killed, as I have described, by turbines, passing down to the sea. Then, secondly, the number of fish killed in the breeding season about the weirs and in the water-courses, and also the number of fish poisoned by deleterious matter getting out of these bleaching-mills and other works.

2181. Which reason do you think is the most important reason?—I think the most important reason and the way in which most fish are destroyed by passing through turbines.

2182. Has there been any increase in the number of pike in the river during the last few years?—I have not remarked any. The anglers tell me that there is a decrease of pike.

2183. Can you tell the Committee the difference in the state of the Upper Bann at the present time and when you were a boy?—Yes. I was reared, I may say, on the banks of the Upper Bann, and I mind 25 years ago there were quantities of salmon bred there, from Guildford all up above Banbridge. Now there is not a salmon to be seen in it, and I attribute the cause to what I have stated: the poisonous matter, the number of turbines, no fry guards and no gratings at head races or tail races.

2184. Can you mention any other stream where it is so?—Yes, the Six-Mile Water. Some number of years ago that was a splendid breeding river for salmon.

2185. How long ago?—About eight or nine years ago.

2186. Before the erection of these turbines?—I do not know how long ago it is since the turbines were erected. It was a good salmon breeding river, and now there is not a salmon to be seen in it.

2187. What is the cause in that case of the diminution in salmon?—There are a number of turbines on it also I understand. I am not thoroughly acquainted with that river as to the number of turbines on it, but I know the river very well and have fished on it.

2188. You say you are not so familiar with that river, but can you give the Committee some idea of what number of turbines there are on it?—I know there are two turbines on it, and I know one man took out one of his turbines because it did kill young salmon; that was stated at the petty sessions.

2189. Do you say he took one of his turbines out?—Yes; because it killed some fry.

Mr. Macartney.

2190. Give us the date of that, please?—That was stated at Randalstown Petty Sessions, I think in 1889.

Mr. Seton-Karr.

2191. Is the mill running now?—Yes; it was working about six months ago when I was there.

2192. What is there there now, a bucket wheel?—No, a turbine. It was stated at Randalstown that he had a turbine that did kill the fish, and he took it out, but whether he substituted any other for it I do not know.

2193. All you know is that he had a turbine?

Mr. Seton-Karr—continued.

—I do not know that of my own personal knowledge; I only know that from statements I heard.

2194. Did you hear that stated at the petty sessions?—Yes.

Mr. Macartney.

2195. Did you hear him make it?—Yes.

2196. Who did you hear?—It was a witness who was brought up by Mr. Webb, I think. It was not a witness brought by me, and Mr. Webb had witnesses there, and I believe it was one of his witnesses who said it.

Mr. Seton-Karr.

2197. It is a matter you know by hearsay?—Yes, it was tried to prove that this turbine of Mr. Webb's did not kill fish and was not of the same construction as another turbine, and this was brought forward as a proof; that is my recollection of the matter.

Mr. Macartney.

2198. Was it not this: in order to prove Mr. Webb's turbine killed fish, you called a man who swore that his turbine did kill fish; is that right?—That is not right.

Mr. Seton-Karr.

2199. Do you think it made any difference in the injury of the fish by his substituting one turbine for another?—No, I do not; I think all turbines will kill fish.

2200. Was this man compelled by law to alter his turbine, or did he voluntarily do so?—I am not aware of that. My recollection of the matter is, that he took it out of his own good will, because it did kill.

2201. And he put in another kind of turbine which did not do so much injury to the fish?—That is how I understood the matter at the petty sessions.

2202. But you do not believe it made much difference as far as the danger of the turbine to the fish is concerned?—Not at all.

2203. I was asking you how many turbines there were on the Six-Mile Water?—Of my own knowledge, I only know of two, but I believe there are more.

2204. Do you attribute the decrease in the fish in the Six-Mile Water to the existence of these turbines?—Yes, to the existence of turbines and poisonous matter getting into the river.

2205. Which is the most important reason in your opinion?—On the Six-Mile Water, I believe, the poisonous matter from Ballyclare paper mills is the most important.

2206. You do not think the turbines in the Six-Mile Water so bad as the turbines on the Maine, do you?—I believe the turbines on the Six-Mile Water and this poisonous matter is the cause of it altogether.

2207. Between them, you think, one is as bad as the other?—I believe the poisonous matter coming from Ballyclare paper mills is the chief cause.

2208. Do you believe in that case the turbines only assisted?—They largely assisted in doubt.

2209. With

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MR. MOLLS.

[Continued.]

Mr. *Seán Kerr*—continued.

2209. With regard to poaching, do you think there is as much poaching now as there used to be?—No, not near so much.

2210. What is that owing to, do you think?—There are not the opportunities for poaching that there were some years ago.

2211. Do the board of conservators look after the fishery rather better than they used to do?—They do.

2212. As to the poaching that does go on, does it go on more round about mills and mill races than at other places or not?—The facilities offered for poaching are larger about a mill, because there are watercourses there, and the fish are diverted from the main stream into those watercourses. There are many opportunities for poaching there. I do not believe any of the mill-owners encourage any person, but at the same time it can be done without their knowledge.

2213. Exactly, it is not an easy thing where you have a large number of mill hands to prevent some poaching?—It is very hard, because they get into league with one another, and watch for one another, and they have spies out when water-keepers or inspectors are coming about, and they can give the word before you can get near them.

2214. I suppose the temptation to mill hands to poach is very great where you have the salmon coming into a mill race?—Yes, and the opportunities are great.

2215. That means that great additional expenditure is thrown on the conservators in watching their interests, does it not?—Yes; more than half the expense in my district is incurred in the protection of fish about water courses in connection with mills.

2216. Can you tell us whether any of the mill owners who use turbines have fry guards in front of them?—Do you mean at present?

2217. Yes, at present, or have had at any time?—Yes. There are 15 millowners that have turbines in my district, and 13 of them had fry guards in front of their turbines in the years 1890 and 1891. I visited those mills repeatedly, some of them 17 times during the months of March, April, and May, and found the latticing in position in front of the turbines on all occasions.

2218. In what part of your district was that?—That is on the River Maine and its tributaries: Kells and the Brando Water.

2219. Have they got those gratings in place now?—I am speaking of fry guards now.

2220. I mean fry guards; have they them in place now?—I could not say.

2221. They had in 1891?—They had in 1890 and 1891.

2222. You have told us the turbines kill large numbers of fish, but if those fry guards were kept in position during March, April, and May, would that prevent the turbines killing the fish?—Certainly; they could not get in.

2223. Then it has not always been the case that the millowners have kept those fry guards there?—No. I did not know of any being erected until 1890-91.

2224. Cannot you tell us whether they have been taken away or not since. Are they still there is what I want to know?—I have only visited two of them, and they were not there. I under-

Mr. *Seán Kerr*—continued.

stood privately that the owners would not put them up this season owing to the decision that was given by the county court Judge of Belfast upon an appeal.

2225. Then they have not got them up?—I visited two of them and found them not up.

2226. As to the others that you have not visited, do you know or have you heard whether they have the fry guards there?—I do not know.

2227. Have you no knowledge whatever they have fry guards there or not at present?—I have not.

2228. While the millowners maintained these fry guards in front of their turbines during 1890-91 did you hear any complaints of those fry guards affecting the working of their mills?—No. I have already stated that I was at some of those mills 17 times during the three months of March, April, and May. I saw the proprietors occasionally and none of them ever made any complaint to me about their having to stop their mills, or having received any injury at all. The only complaint they ever made to me was that the party who was receiving the benefit of the fish being preserved should put up these things and keep them clean, that is all.

2229. You say there were 15 mills at that time that had them up?—Yes.

2230. And the owners of none of them made any complaint to you?—None.

2231. Were their mills working the whole time after the guards were put up?—Every time I was there they were working as usual, and I heard no complaints.

2232. All the complaint was that they thought the conservators should pay some part of the cost of putting up these gratings?—No; they said the party who received benefit from the protection of the fish should put them up and keep them clean.

2233. Was the only complaint they made that they had to pay the whole cost of the fry guards?—Just so.

2234. What kind of fry guards were they, anything like that one in the room?—No, that is a lattice wire, it is lighter than any I have seen.

2235. That is a cheap form of fry guard, is it not?—Very cheap.

2236. What kind of fry guards had they?—They were all on the same construction, but heavier wire than that.

2237. They did not get blocked up in that way I suppose?—I never saw any blocked in that way at all; that is completely jammed up with wood.

2238. What is the reason that that fry guard got blocked up so soon, and had to be taken out, whereas the fry guards you speak of are not?—There is a woollen mill immediately above where that netting came from (Messrs. Arthur and Company's works, at Kells), and the water that feeds the two turbines at that mill feeds Mr. Arthur's mill before it returns to the river, and of course all the refuse coming down that mill race would pass through that grating before reaching Mr. Arthur's turbine.

2239. Then do you tell the Committee that that is a special case?—A very special case.

2240. And that under ordinary circumstances

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Mr. MOLES.

[Continued.]

Mr. Selw-Kerr—continued.

no fry guard would get blocked up in the way that one has got blocked up?—No. I may state that I think it is rather strange that so much wool is collected upon that fry guard, and that it should get into it, or did get into it.

2241. You do not understand how so much wool got into it?—I do not; it seems rather strange.

Mr. Pinkerton.

2242. Do you mean to insinuate that it is specially prepared for the Committee?—I am not insinuating anything; I am only stating to the Committee that I think it very strange that so much wool has gathered on it.

Mr. Selw-Kerr.

2243. At all events there was wool coming down with the water from the mill above to that particular place, you say?—Yes, the mill above is a woollen mill, and the water that feeds that mill passes on to the mill where that grating was before it returns to the river.

2244. Therefore it did not require any ingenuity to fill that grating with wool at all, did it?—I do not say it was filled at all; it came down with the water, no doubt.

2245. Do you think there would be any difficulty in properly cleaning these fry guards that you have mentioned at these 13 mills, and keeping them properly cleaned?—If they were put down in the way the Inspectors of Irish Fisheries direct, I do not think there would be much difficulty at all. They direct that there should be two of these fry-guards, and when one got full that it should be taken out and left on the side, and then as soon as it became dry the stuff should be shaken off. I have seen it myself done. They should take one out, and put the other in.

2246. In other words the fry-guards are slid down into grooved standards?—Yes.

2247. And it is a very simple matter to lift the dirty fry-guard out, and put the clean one in at stated intervals, is it not?—Just so.

2248. I know you are not an engineer, but can you give the Committee, as a practical man, any idea of what would be the cost of erecting a fry-guard such as you are now describing?—It would be according to the width of inlet to the turbine. Some of the inlets to the turbines are as wide as 10 feet. I should say if there were three, and three spare ones, which would be six altogether, they would cost about 5*l*.

2249. Do you mean three slid down in one row?—Just so; I should say about 5*l*. would be an outside price.

2250. What do you think of an estimate of 1,400 *l*. for erecting a fry-guard?—I know Mr. Webb's head race.

2251. What do you think would be the cost of erecting such a fry-guard as you have described there?—For his two turbines?

2252. Yes?—If he made a fry-guard like that in the row it would not cost 5*l*.

2253. What would it cost to erect one like the one you are describing?—It might take a little more than I have stated, because the two turbines are not together; one mill is placed above

the other. I should say 8*l*. to erect the two would be an outside price.

2254. Would that include the whole cost of the frame work and the fry guards and the masonry work?—No, I am not speaking of the masonry work, that is there already.

2255. Give me your outside estimate of what the whole thing would cost, viz., putting in fry guards there, with the necessary work, and with the spare fry guards to put in?—I may tell the Committee that at all turbines there is a grating put immediately in front of the turbine for the millowner's protection, I suppose. We would allow the latticing or the fry guard to go up inside that grating, which is standing there for the purpose of keeping back debris, sticks, or any other matter that may gather. So that this fry guard is sitting inside that grating which keeps back the greater part of the matter coming down the river, and there is the frame there already. There is the wall each side, and they have nothing to do but to put on the little slides and let the guards go down into them.

2256. Then do you think it would be a matter of comparatively small cost to the millowner to put these fry guards in during the months of March, April, and May?—The fry guards that are erected at Moorfields, where Mr. Caroe carries on business, the manager told me, cost him 2*l*. 5*s*. in Belfast.

2257. Who told you that?—Mr. Todd, the manager of the Moorfields dyeing and finishing works; I asked him where he had got them, and he told me in Belfast. I asked him what they cost, and he said, 2*l*. 5*s*.

2258. In your opinion then, guards of that kind would not affect the working of a mill?—I am quite confident they would not if they were kept clean.

2259. And the process of keeping them clean would be made very easy by having a duplicate set which could be substituted when the first lot got dirty, would it not?—Yes, when one gets foul it should be lifted out, and they should put in another and leave the first against the wall. There are always hands about, so that it would entail very little expense for the men to go round and look after them. Then when the first one gets dry they can take a coarse brush, give it a rub, and all the dry matter will fall off easily. Then when the second one gets foul they can put back the clean one again.

2260. I suppose you would also recommend the providing of a bye-wash for the salmon and fry to go down without going through the turbine, would you not?—Certainly, I would have a bye-wash erected somewhere as near as convenient to the turbine, because if the fish came forward they would have a chance in any of the spare water passing over this bye-wash.

2261. It would not be an expensive matter making a bye-wash of this kind, would it?—It would not.

2262. And they need not open it except when the mill is stopped at night?—But you see, even when the mill is stopped at night where are the fish to get to if there is no bye-wash?

2263. Exactly. You must have a bye-wash for the safety of the fish?—You must.

2264. It

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[Continued.]

Mr. Seton-Karr—continued.

2264. It would not affect the working power of the mill at all, in your opinion, would it?—When the place is stopped the water would then pass over this bye-wash.

2265. And that is all that is necessary to be done to protect the fish. You need not have the bye-wash open when the mill is working?—When the mill is working they require all the water; so that there would be none passing over the bye-wash.

2266. But the way it would operate would be this. When the mill stopped work they would open the bye-wash and let all the fish that had collected in the mill race pass out without any injury?—Just so.

2267. With regard to gratings erected at the foot of tail-races, we had some evidence about a grating which was erected at the tail race of Mr. Gault's mill?—Yes.

2268. Do you know that mill?—I do, very well.

2269. Do you happen to know the circumstances under which that grating was put up?—I do.

2270. Will you kindly tell the Committee all about it?—He was required to put up a grating at his tail race. The way he constructed the grating was this. He cut a notch in the bank on each side, threw a plank across, and when the race was stopped he put another plank across the bottom, and bored holes in the two planks two inches apart. Then he put those bars down through. There was no wall to support the thing, there were simply these two planks there, and when the water was let in the whole thing was pushed away as there was nothing to support it. That is the reason why he said the sides of his tail race were carried away.

2271. In other words it was a badly constructed grating?—Ridiculous.

2272. So constructed as to catch all the *débris*, and so insure its own destruction?—Yes.

2273. Will you describe a properly constructed grating?—It should be set well out into the ground, in this way (describing).

Mr. Pinkerton.

2274. Are you including that in the 2 L 5 s. estimate?—No, I am speaking of the tail-race now. I was speaking of fry guards in the other case. Then from its form the water is thrown from the sides by the stonework upon it, and if it was made as a V shape it would give more space. The bars should be set horizontal, and there should be an opening left of two inches between each bar, and leaves coming down would fill out naturally.

2275. You would have it pointing down stream?—Yes.

2276. What would be the cost of that?—I have no idea.

Mr. Youlston.

2277. As I understand it would be something like an eel basket?—Yes, nearly on the same principle.

Mr. Seton-Karr.

2278. Would you have it made so that the gates which you describe could be open at intervals to 0.80.

Mr. Seton-Karr—continued.

let out the *débris*?—Yes; that would still be an improvement.

2279. What your evidence amounts to is this: that a perfectly good grating can be put at the foot of a tail-race which would not affect the working power of a mill?—They have been in operation for the last two years at some of the mills in my district, and they have never been taken down.

2280. But the grating of which Mr. Gault complained, and of which evidence has been given, was badly constructed, and it was his own fault that it interfered with the working of his mill; is that your evidence?—The fault was in the construction of it; but he made application, I may say, and got exemption.

Mr. Macartney.

2281. Can you give me the names of these mills where the gratings are?—Mr. Georgian of Lismillan, Mr. Maclean of Fenshy, and Joseph B. Black, of Rose View.

Mr. Seton-Karr.

2282. Do you attach as much importance to these gratings at the foot of tail races as you do to the fry guards in front of the turbines?—I do not.

2283. They are not so important a matter?—They are not.

2284. But they can be quite easily constructed, can they?—Quite easily. I may state to the Committee (possibly they are aware of it) that they are only required at tail-races for three months in the year, and at the head-races not more than two months. The three months is the time the breeding fish are coming up the river. They are required at the head-race for two months to prevent the fish from getting in about the mills coming down the river after they have spawned.

Mr. Pinkerton.

2285. That is five months of the year in all?—Yes, three months at the tail-race, and two months at the head-race.

Mr. Seton-Karr.

2286. Can you tell the Committee what, in your opinion, would be the expense of putting up such a grating as you have described at the tail-race, roughly speaking?—That would depend very much on the nature of the ground on which you would have to construct a grating.

2287. Would it cost 20 L?—I am confident that the one Mr. Georgian has erected did not cost 20 L. I know what his blacksmith and his carpenter told me.

2288. Would it cost 10 L. under ordinary circumstances?—I believe his did not cost 10 L.

2289. Do they cost 5 L?—Yes; I heard that this particular one cost about 7 L.

Mr. Pinkerton.

2290. Does that include the masonry work at all?—There was no masonry work on this one.

Mr. Seton-Karr.

2291. With regard to the gratings at the head-races, do you attach much importance to them

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Mr. MOLES.

[Continued.]

Mr. Selwin-Kerr.—continued.

them from a fishery owner's point of view?—The grating alone, do you mean.

2292. Yes?—It is certainly important that the fish coming down the river should be protected as well as when they are going up. It is a greater loss, I presume, to the fishery industries that fish be killed going up the river before they have spawned than it is after they have spawned going down. That is my opinion of the matter.

2293. And if they saw into the mill-race provided you had a good bye-wash, the grating at the head of the mill-race would not be a matter of such very great importance?—Not of so great importance in my estimation.

2294. At the same time do you think that gratings can be erected at the head of mill-races to prevent salmon going into the mill-races, as they are going down to the sea without interfering with the mill power?—They are erected, and do not interfere with the mill power.

2295. Will you kindly mention the names of mills where they are erected?—At Fanaghy Mills they have had them erected for the last two years permanently; they are kept there permanently, and there has never been any complaint made to me about them.

2296. What kind of mill is that?—It is a finishing mill.

2297. Have they a turbine?—They have, and a water wheel also.

Mr. Selwin-Kerr.—continued.

2298. Has that grating been put up to prevent the salmon coming into the mill-race?—Yes.

Mr. McCartney.

2299. Who is the owner of this mill?—Mr. Maclean.

Mr. Selwin-Kerr.

2300. Have they much trouble in keeping it clean?—There is a bye-wash immediately by the side of it. Here is the grating at the head race, and here is the bye-wash.

2301. Have you ever heard any complaints about this grating as to keeping it clean?—Never.

2302. As a matter of fact do many leaves or weeds come down the rivers in your district in the months of March, April, and May?—Any weeds and all other matter collected about rivers decay in the autumn, and the winter floods carry them away, and in fact act as a cleanser for the whole river.

Mr. McCartney.

2303. Would you give me the exact address of Mr. Maclean; what is the firm's name?—I know it is Fanaghy; Mr. Maclean is the man who is carrying on the work there.

2304. Is he owner and proprietor or the manager?—Mr. Young, I believe, is the owner of the place.

2305. Mr. William Young or Mr. John Young?—Mr. William Young, I believe, it is. I think he has let this mill to Mr. Maclean.

Tuesday, 5th April 1892.

MEMBERS PRESENT :

Mr. Cox.
Sir John Whittaker Ellis.
Mr. Finucane.
Mr. Hayden.
Mr. Hozier.
Mr. Macartney.

Mr. O'Neill.
Mr. Pinkerton.
Mr. T. W. Russell.
Mr. Seton-Karr.
Dr. Tanner.
Mr. Tomlinson.

SIR JOHN WHITTAKER ELLIS, BART., IN THE CHAIR.

Mr. EDWARD MOLES, re-called; and further Examined.

Mr. Seton-Karr.

Mr. Seton-Karr—continued.

2306. THE last thing you told us on Friday was, that in the months of March, April, and May there are very few weeds coming down the rivers?—Very few.

2307. So that the gratings do not, in fact, get clogged with debris to any very serious extent at such times, do they?—They do not, because the floods of the winter carry the decayed weeds and other matter down, and there is no grass-cutting in my district until the latter end of June.

2308. So, in fact, the months when you would like to see the fry protected by fry guards are the very months when the millowners would be the least likely to be troubled with weeds coming down the river; is that so?—That is so.

2309. Did you hear Mr. Wilson's evidence on that point?—Yes.

2310. You do not agree with it, do you?—I do not.

2311. What is Mr. Wilson's district; does he live in the same district as you do?—Do you mean Mr. Wilson, the engineer?

2312. Yes; does he know your district?—I do not know whether he does or not; I am not at all aware.

2313. What can you tell the Committee about the Canadian weed?—It grows principally in mill waters, on the main water.

2314. Do you think it does any injury to salmon?—I never heard at all of its doing any injury to salmon until I heard it here. None of the anglers have ever mentioned it as doing any injury to salmon, and I have had every opportunity of knowing if they had.

2315. Do you think it is possible it can do any injury to salmon?—It is not poisonous, and it is not possible that fish would get entangled in it at all.

2316. Would it affect their breeding in any way in the spawning beds?—The places where it is got are not places in the river where there is gravel, which fish spawn in. It is got in still waters, and the fish do not spawn there.

2317. Can you tell us how much of the ex-

pense occasioned to the conservators in watching the fish is incurred in the neighbourhood of mills?—Considerably over half of the expenses of my district are incurred in looking after mill races and other places in connection with mills.

2318. In other words, the existence of mills causes a very serious increase in the expenses of protecting fish, does it?—It does, very considerably.

2319. And do you say that that amounts to half or more than half the whole expense?—A little over the half; I am referring to my own district only.

2320. In instituting proceedings against a mill-owner, whose instructions do you act upon?—I always act under the instructions of the board of conservators.

2321. Will you give the Committee what information you can of the circumstances under which, in the year 1890, Mr. Webb was summoned at the instance of the conservators?—Yes. I called upon him repeatedly before summoning him, and told him there was no way out of the matter unless he had obtained an exemption under the Act. After having called upon him a few times he said he was not going to put up any erections, and that I might do as I pleased. I wrote him some time after that, and served him with a printed notice that I had received from the Inspector of Irish Fisheries at Dublin Castle.

2322. Have you a copy of that notice?—Yes, here it is (*producing notice*).

2323. Did you serve him with this notice?—Yes.

2324. When did you serve it?—A few days after the date of the notice I served him with it. I could not say what date.

2325. In what year was it you served him?—In 1890.

2326. Somewhere about the middle or end of April did you serve this notice on him?—Yes.

2327. What happened then?—He took no notice,

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Mr. MOLES.

[Continued.]

Mr. Selous-Kerr—continued.

notice, and I was reluctantly compelled to issue the summonses against him.

2328. You had no alternative, I suppose?—None; it was a matter of duty.

2329. Did Mr. Webb say anything to you at the time?—No.

2330. Did he say anything to you on the subject of the summonses before you issued it?—There was some conversation, the particulars of which I cannot just recollect now, but the purport of it was that he would resist it.

2331. The summons was heard in the autumn of 1890, I believe?—Are you speaking now of the turbine?

2332. I am speaking of the summonses against Mr. Webb, which we were alluding to?—There were two occasions on which he was summoned.

2333. The first summons was heard, was it not, in the autumn of 1890?—That is right.

2334. At Randalstown petty sessions?—Yes.

2335. What happened?—The magistrates found the case proved, and convicted Mr. Webb in a fine of 21 s. and 1 s. costs, so that he might have an opportunity of appealing. That was the first case. He did enter an appeal against that, but did not prosecute the appeal, and the fine was paid.

2336. The magistrates, you say, decided to give him every opportunity of appealing?—Just so.

2337. And he did not appeal?—He entered the appeal, but did not prosecute it.

2338. And he paid the fine of 21 s. and 1 s. costs, did he?—Yes.

2339. What happened after that?—I then called upon him again, and said I was instructed to see that the gratings were erected.

2340. What date was that?—I cannot mind the date; it was some time after that, but I could not exactly say when.

2341. We have got as far as what happened in the autumn 1890. Then you say that you called upon Mr. Webb some time after that. Did you call on him in the beginning of 1891, or the end of 1890?—I think it was the beginning of 1891.

2342. Can you remember the month?—I think it was March.

2343. That would be the early spring of 1891?—Yes, I think it was March.

2344. What happened?—I told him that I was instructed to see that the gratings were erected. He passed into his office. I was waiting in the outer office, and I do not mind whether he spoke or not, but I wrote him a few days after that again and he produced a letter. Then I summoned him for not erecting a grating at the head race, and not putting up fry guards in front of the turbine. The two cases came on at Randalstown petty sessions, I think, in March. The case in reference to the grating of the head race stood over at his request, in order that he might make an application to the inspectors of Irish fisheries with the view of obtaining exemption. The other case was then heard, and the magistrates fined him 21 s. and costs again.

2345. That was a second time, was it?—That was with regard to the latticing, or rather the fry guard, in front of the turbine. He appealed that case to the court of quarter sessions of Belfast,

Mr. Selous-Kerr—continued.

where it was heard, I think, on the 30th April, and the county court judge reversed the decision in favour of Mr. Webb.

Mr. T. W. Russell.

2346. On what ground?—On the ground that he had not engineering evidence before him, I think.

Mr. Selous-Kerr.

2347. Did Mr. Webb say anything to you at the time when you saw him in March, or about March 1891, to lead you to believe that he was about to apply for an exemption?—No, he did not. I never heard of him going to apply for an exemption. I even suggested the matter to him. I may also state that when the first case was heard with reference to gratings at tail races, and he was fined 21 s. and costs, one of the magistrates (I think it was the chairman) said, "There is no way out of this except by getting an exemption."

2348. If I understood you rightly, the first summons was on account of the absence of the grating, was it not?—Yes.

2349. The second one was on account of the absence of a fry guard?—And a grating also at the head race.

2350. Could Mr. Webb have obtained an exemption before you applied for the summonses, in accordance with your instructions?—I would expect so, inasmuch as he obtained it afterwards. I think he had the same opportunity to obtain it before I had proceeded against him as he had afterwards, and I would have been very glad if he had done so. It would have saved me trouble.

2351. And it would have saved him trouble, would it not?—It would; it was a matter over which I had no control.

2352. You simply acted according to your duty, did you?—Just so.

2353. Had Mr. Webb applied for the exemption previously, it would have saved him all the trouble of being summoned, and have saved you all the trouble of issuing the summonses against him, would it not?—Just so.

2354. Was there any reason you know of why Mr. Webb should not previously have applied for exemption?—I know of no reason why.

2355. If he had so applied he would have got it, would he?—I expect so, inasmuch as he did get it afterwards.

2356. Was there not a third summons heard in April 1891, at Randalstown, or was that the second summons?—I have spoken to that one; that was the second case, with regard to the turbine.

2357. Did you issue any more summonses in 1890 against any other millowner?—Yes, in the Ballymena district.

2358. Will you kindly give us the particulars of those; when they were heard, and what happened?—I think it was in March they were heard also.

2359. In March of 1890 or 1891?—I think it was 1890. I summoned eight millowners, having called on them repeatedly to try and induce them to put up gratings at head races and tail races. They declined to do so, and I had then to sum-

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Mr. MOLES.

[Continued.]

Mr. Seton-Karr—continued.

men them. The cases were heard before the magistrates at the Ballymena petty sessions, and were dismissed against me with 1*l.* costs in each case. I appealed the cases to the quarter sessions.

2360. On what ground were they dismissed?—I do not know. I proved that the rivers were frequented by salmon, and that these men used the water supply from those rivers for motive power to their machinery.

2361. What happened on the appeal?—The county court judge reversed the decision of the magistrates below, and convicted each of the millowners in a penalty of 1*s.* and 1*l.* costs.

Mr. T. W. Russell.

2362. The county court judge reversed the decision of the magistrates below, do you say?—The magistrates below dismissed the cases with 1*l.* costs to each of the defendants, or, in other words, 1*l.* costs against the board of conservators in each case. I appealed against that, and the county court judge reversed that decision. Some three months afterwards I applied to the magistrates at petty sessions for distress warrants, so that the fines might be paid, as they had not been paid, but they refused to sign them, and I made another application.

2363. Then am I to understand this: that in Mr. Webb's case the county court judge reversed the decision of the petty session court fining Mr. Webb?—No, I am not now speaking of Mr. Webb's case.

2364. I know that, but is not that the case; you have given evidence to that effect, have you not; have you not given evidence that the county court judge reversed the petty sessions decision in Mr. Webb's case?—Yes.

2365. Then you say in the other case the magistrates acted on the decision of the county court judge, and dismissed the case?—They did not, because this was previous to Mr. Webb's case. I made a second application before the magistrates at Ballymena petty sessions to issue distress warrants, but they refused to do so, and we then had to make an application to the Court of Queen's Bench in Ireland for a mandamus that the orders might be executed, and the fines were then paid.

Mr. Seton-Karr.

2366. You have no doubt, have you, of these facts; you are speaking of your own knowledge, are you not, with regard to them?—Certainly.

2367. The only thing you are uncertain about is the dates; cannot you tell us a little more certainly about the dates?—No, I kept no record of them.

2368. Then does it amount to this: that you summoned several millowners in the beginning of 1890; the summonses were heard before the magistrates and dismissed, but on appeal to the quarter sessions those decisions were reversed, and the millowners were fined 1*s.* and 1*l.* costs each?—That is right.

2369. The fines were not paid, the magistrates refused to sign the warrants, and an application had to be made to the Court of Queen's Bench for a mandamus to the magistrates, on which the fines were paid; is that so?—That is correct.

2370. Will you mention the names of these

0.80.

Mr. Seton-Karr—continued.

millowners?—There were eight; they were the Braidevater Spinning Company, Messrs. Gault Brothers, Joseph B. Black, Alexander Currell Kerr, Messrs. Fraser and Houghton, Francis Dinmore, John Dinmore, and Messrs. Arthur and Company. I think these are all.

2371. In any of these cases could exemptions have been procured by the defendants, had they applied for them?—I suggested to them the propriety of applying to the inspectors of Irish Fisheries, with the view of getting exemptions. It was not my place to apply on their behalf, but I suggested the matter to them, and that they should do it.

2372. What did they say?—They talked it off; they did not make any application until after they were summoned; then they made application and the inspectors came down.

2373. Then you mean today, do you, that they did not take the trouble to apply for exemption in any case?—Not until I had brought them into court.

2374. And you were compelled, I suppose, in the ordinary course of your duty, to act as you did in issuing the summonses?—Certainly.

2375. With regard to the injury to fish by turbines, did Mr. Webb ask you to go and examine his turbine?—He wrote me to say that he had erected a plank some way across his tail race, so that an opportunity could be obtained of seeing whether there were any fish killed or not, but I was satisfied upon that matter upon a previous occasion, and I did not go at Mr. Webb's suggestion. He was perfectly safe in making the offer, for it would be impossible to see fish while his mill was working.

2376. In other words, you could not have ascertained while his mill was working whether his turbine actually killed fish or not?—Yes; and I might have been there two days, and there might have been no fish passing through during the time I was there. They may not have been running down.

2377. What time of the year was it he asked you to go there?—It was some time previous to the hearing of that case at Randalstown petty sessions. I think it would be in March, possibly.

2378. And that would be, would it not, rather earlier than the salmon fry would be running down to the sea in any large quantities?—It would.

2379. In fact, would any fry be running down to the sea in March, in your district?—Yes, some would, but it is a rare occurrence.

2380. But supposing fish had been killed in the turbine at the time, it does not follow that you would have seen them, does it?—It does not.

2381. They would be carried away in the tail race, I suppose?—They would.

2382. Therefore you think Mr. Webb was very safe in making that offer to you, do you?—I do.

2383. Were any fresh instructions given you by the conservators after the agitation in county Antrim, or in consequence of any statements made on the subject of that agitation in Parliament?—None whatever.

2384. No fresh instructions whatever were given to you, you say?—I never received any instructions

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Mr. MOLES.

[Continued.]

Mr. Seton-Karr—continued.

instructions with reference to putting up gratings and fry guards.

2385. Is it a fact that persons who might have been prosecuted at that time have since obtained exemptions from the fishery inspectors?—It is.

2386. Will you give their names, please?—In fact all the millowners. All the millowners have got either entire exemption or partial exemption.

2387. All the millowners where?—On the Main, the Kells, and the Braide river. Mr. Webb has obtained entire exemption.

Mr. Macartney.

2388. But he has been prosecuted. I want the names of those who have not been prosecuted, who have exemptions?—There is a Mr. Gaston on the Clough river.

2389. Has he got a turbine?—No, he has no turbine; it is a water wheel, but he has got exemption. Mr. Caruth, who has two mills, has obtained exemption.

Mr. Seton-Karr.

2390. What is the nature of the exemption in these cases you have mentioned?—They are exemptions from gratings.

2391. Where; at head race, or tail race, or both?—At head race, and for three months at the tail race in the first case I mentioned.

2392. About what date were these exemptions obtained?—The latter end of last summer. As soon as they applied for them the inspectors gave them the exemptions.

2393. Do you mean about August or September?—Yes, or it may be October. There is another man near the top of the river, who has a bucket wheel and a turbine, who got exemption as to head race and tail race, but he was to put up a fry guard during the months of March, April, and May. A Mr. Morton on the Kellwater was not summoned, and he has got entire exemption. The Moorfields Dyeing and Finishing Company, who were not summoned, have got exemption. A Mr. Macmason, on the same river, who was not summoned, got entire exemption. Mr. Ross has got exemption as to head race and tail race, but at the head race he is to erect gratings for three months in the year. Hannah Brothers have got exemption as to head race and tail race for all the months of the year, and a Mr. Thomson also.

2394. Were these exemptions all obtained last summer, or were any of them obtained previously?—They were all obtained in 1891; the inspectors were down twice during that year.

2395. Generally speaking, in your district, have the millowners had any difficulty in obtaining these exemptions?—None.

2396. Are they granted by the fishery inspectors in every case?—They are very freely given.

2397. On what ground, as a rule, do the fishery inspectors grant exemptions?—They hear the millowner, as far as I am concerned, alone. They hear his evidence, and I suppose upon that evidence they give the exemption.

2398. Do they hear any evidence on the other side at all; is there ever any opposition to these applications for exemptions?—There is none from me.

2399. Do you ever oppose them?—No.

Mr. Seton-Karr—continued.

2400. Do you know of anybody else opposing them?—I do not.

2401. Then do you state confidently that the millowners have no difficulty whatever in obtaining these exemptions, wherever they can be reasonably granted?—I know of one case where they inspected the man's mill, and directed that he should keep up the gratings at his tail race for three months in the year. He did put them up, and made a further application to them, when they came again and inspected his mill race, and gave him entire exemption.

Mr. Macartney.

2402. What case was that?—That was the case of Mr. Gault.

Mr. Seton-Karr.

2403. But until he received the entire exemption he maintained the grating at the tail race, did he?—He did not.

2404. But did it interfere with the working of his mill?—That is the one I described as having been carried away.

2405. Speaking of the millowners in your district; Mr. Webb told the Committee that he is, practically, breaking the law in not complying with the provisions as regards gratings and fry guards. Are there any other millowners, to your knowledge, in your district in the same position?—No, none. They all complied, or otherwise got exemption.

2406. Is it true that any proceedings have been taken against Mr. Webb because of his taking a prominent part in endeavouring to get the law altered?—Not at all.

2407. Can you give us your reasons for saying that, or any illustration of any kind; can you give us any facts to show that Mr. Webb was not proceeded against because he had taken a prominent part in trying to get the law altered?—There was no agitation commenced at the time Mr. Webb was prosecuted.

2408. Is it, or is it not, the fact that Mr. Webb was the last man against whom proceedings were taken?—It is; and I did my very utmost to get him to comply with the law, so that I might not have to bring him into court.

2409. When was notice first served in Mr. Webb's case?—I understand there was a notice served in 1885, but it was not served by me; I do not know it of my own knowledge.

2410. At all events there was an old notice served in Mr. Webb's case, you believe?—I believe so.

2411. And you say that notwithstanding that fact Mr. Webb was the last man against whom proceedings were taken?—He was.

2412. And no agitation whatever, you say, had been commenced at the date of the first prosecution?—None.

2413. With regard to the number of anglers in your district, have they increased or decreased during the last four years?—They have considerably decreased; I should think they have decreased about half within the last six years.

2414. What do you attribute this to?—The anglers have told me themselves that it is not worth while paying for a license for salmon red fishing,

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fishing, because there is not enough salmon in the river to pay them, and that it is not worth while going to the expense.

2415. That means, I suppose, that the funds at the disposal of the conservators for the protection of the fish are decreased?—Yes, considerably decreased, because if there were more licenses bought it would increase the funds at the disposal of the board of conservators; we would be very glad if there were more anglers, or if there were more fish for them to catch.

2416. What do you think would be the effect of the prosperity of your district on Ireland?—It would be a sure sign that there were plenty of fish there, and every man who was an angler of a respectable class would protect the fish from poachers.

2417. Would not the effect of more anglers be to bring more money into that part of the country?—Of course it would. Men coming from England and other places would reside in the district.

2418. And it would increase, I suppose, the prosperity of the community, would it not?—It would.

2419. Is it the fact that prosecutions are, or are not, brought for poaching by water bailiffs?—No, there are no prosecutions brought by water bailiffs. That duty devolves upon me. It is always performed by the district inspector of fisheries.

2420. How many prosecutions have you brought lately?—Fifteen within the last six or seven months.

2421. It is not the province of the water bailiffs, I believe, to prosecute, is it?—It is not. They report the cases to the district inspector. He hears their statements, and uses his own judgment in the matter as to whether a summons should be issued or not.

2422. Was there anything particular in the nature of these prosecutions that you have to tell us, or were they ordinary prosecutions for poaching?—They were just the ordinary cases.

2423. Were there cases of poaching salmon in the neighbourhood of mills?—One of the cases was in connection with a mill, and another was for poisoning part of the river with lime.

2424. Have you read Mr. Macartney's Bill?—Yes, I did, but I did not give it much consideration.

2425. I suppose you have a general idea of its effect, have you not?—I know that its purpose is to repeal that portion of the Act which deals with gratings at head races and tail races, and also deals with the erection of the fry guard, but says that if the board of conservators wish to do so they may do so at their own expense, and it must not affect the working power of the millowners' machinery. I think that is about the purport of it.

2426. What do you think the effect of the Bill would be, if passed, on the salmon industry?—The effect of the Bill would be, I believe, that in the course of a very few years we would have no salmon in the upper portions of the rivers, where fish breed. These are breeding rivers, and if

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Mr. Seton-Karr—continued.

they are not taken care of there will soon be no fish at any place.

2427. I believe the whole cost, under the Bill, of erecting gratings and other protections to fry salmon is proposed to be thrown on the conservators, is it not?—So I understand.

2428. And the conservators have no funds, have they?—It would not be practicable at all, because the millowners would have to be satisfied that their machinery would receive no injury. Then there is no alternative except that you must abide by their opinion, whatever that may be. If they say it is injurious, how is it to be remedied, unless the matter is left to someone who can properly decide it?

2429. Do you, as a fishery inspector and a practical man, tell the Committee that the Bill is insipid?—I think so.

2430. On the ground that no one is appointed as the judge or tribunal to decide whether the guards are interfering with the working of the mill or not?—Just so.

2431. Is that your opinion?—That is my opinion.

2432. And you have been a fishery inspector for how many years?—Nearly nine years.

Mr. Macartney.

2433. How long have you been inspector of fisheries?—Eight years on the 4th December last.

2434. You have just told the Committee that exemptions were given very freely in the autumn of last year by the inspectors of fisheries?—Yes.

2435. Have the exemptions applied to turbines?—No.

2436. The inspectors of fisheries have no power to give exemptions with regard to the turbine wheels, have they?—The fishery inspectors, as I understand, have no power to give exemptions from erecting lattices in front of a turbine to protect young fish getting into the turbine.

2437. With regard to the Fishery Acts, as far as they apply to turbines the inspectors of fisheries have no power to grant exemption, have they?—I understand not.

2438. Do you approve of the policy that has been carried out by the inspectors of fisheries in your conservancy district?—That is a matter of indifference to me.

2439. But you come here as an inspector of fisheries employed by the Conservancy Board of Coleraine to give evidence as an expert; do you approve of the policy of the inspectors of fisheries or not; please answer yes or no, and you can explain afterwards?—It will require an explanation. I do not approve of it.

2440. Will you tell the Committee why?—Because they have given exemptions for places where I know of my own knowledge that fish have been killed; whereas if a grating had been put up they could not have got into the tail race, and they would not have been killed.

2441. Then do you wish the Committee to understand that, in your opinion, the inspectors of fisheries have given exemptions without making full inquiry into all the circumstances of the case?—I know if the inspectors of Irish fisheries

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Mr. Macartney—continued.

had the same knowledge of the district that I have they would not have given them.

2442. Then, in your opinion, have they acted wrongly in giving those exemptions?—I am not at liberty to express any opinion about the matter.

2443. But you have come here to express an opinion, and I must trouble you to give an opinion?—I have given an opinion.

2444. You say you do not approve of the policy?—Just so. Might I particularise the case?

2445. No; I am putting it to you generally. Do you approve of the policy that has been carried out by the inspectors of fisheries in your conservancy district?—I cannot give a general answer to that.

2446. Will you give a particular one then?—In cases they have done it where if they had known the whole circumstances of the matter I believe they would not have done it. That is my opinion.

2447. You mentioned 15 cases; were they injudicious, in your opinion, with regard to the whole 15?—No, I think not.

2448. In how many of the cases were they injudicious, do you think?—You will understand this; there are only a few cases in which they give entire exemption. The fish come up the rivers to spawn from October onwards, and they have given exemption for nine months in the year, and the other three months in the year they have directed that the gill-nets should be put up in almost all the cases, but in Mr. Webb's case they have not.

2449. Do you approve of their policy or not?—I say there are a few cases where if they had known all the circumstances they would not have done it, I believe.

2450. In how many cases out of the 15?—Three.

2451. In the other cases do you quite approve of their policy?—I cannot approve of it.

2452. Then you do not approve of it at all, do you?—I cannot approve of it.

2453. Do you know anything about turbines?—I have no engineering skill in reference to a turbine.

2454. Do you know anything at all about them?—I have seen them before they have been put up, and I have seen them in the course of erection; and that is all I can tell you about them.

2455. But you do not know anything at all about turbines, do you, or how they are worked?—No.

2456. Can you give us no evidence as an expert?—No.

2457. Do you know anything about the habits of salmon?—I do.

2458. Do you remember giving evidence before the petty sessions at Randsletown, and saying on your oath that you were not particularly acquainted with the habits of salmon?—I was asked if I was an expert in the habits of salmon, and I said I was not.

2459. Then you are not an expert, you say?—No.

2460. This, then, would not be a correct report of what you said there, would it; you are re-

Mr. Macartney—continued.

ported in the "Belfast News" to have answered Mr. Dodd and said you were not particularly acquainted with the habits and customs of salmon; is that a true report or not; you can correct it if you like?—Do you want to know the question put to me?

2461. I want to know if this is a correct report of your view?—I cannot say.

2462. You cannot say whether it is correct or not?—It is not a correct report of my view.

2463. Do you think it is a correct report of what you said then?—I think it is not.

2464. Then you are to a certain extent acquainted with salmon, are you?—I have had every opportunity of knowing all about salmon from my infancy, I may say, having been reared on the edge of a river which salmon frequented, and having angled and such like.

2465. When was your attention first directed as an inspector of fisheries to the destruction of salmon fry and salmon by turbines?—I received instructions from the board to see that the instructions in reference to the matter were carried out.

2466. When?—I think that was in 1889.

2467. Was that the first time your attention was ever drawn to turbines?—The matter had been talked over, I think, at the board previous to that; but then I got definite instructions.

2468. Previous to receiving definite instructions from the Conservancy Board at Coleraine, you, as an inspector of fisheries employed by them, had never had your attention directed, by your close observation of the rivers, to the destruction of salmon fry by turbines; is that so?—That is so.

2469. Never until 1889, but in 1889 you got directions from the Conservancy Board of Coleraine with regard to the abuses about turbines, and then your attention for the first time was directed to the destruction of salmon fry by turbines; is that so?—No; I was aware that turbines did destroy them previous to that.

2470. When?—Many years previously. I was aware of it 20 years ago on the Upper Bann.

2471. Where was the turbine which was destroying 20 years ago the salmon fry in the Upper Bann?—Mr. Green's.

2472. Where is that?—It is at a place called Corbett on the Upper Bann.

2473. Twenty years ago, do you say?—I am sure it is 20 years ago.

2474. Are you perfectly certain?—I am very near certain it was 20 years ago.

2475. We will take it that it was in 1872; were you inspector of fisheries in 1872?—No.

2476. What were you, a water bailiff?—No.

2477. What were you?—I was working with my father at home.

2478. In the neighbourhood of this turbine?—Two-and-a-half miles from it.

2479. And did you then observe the destruction of salmon fry by this turbine?—I got salmon fry killed in shoals below it. I always inferred, before I knew anything about law or anything else, that it was the turbine that killed them.

2480. When you were employed by the Conservancy Board at Coleraine, did you call the

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the attention of the board to your previous knowledge of the destructive tendency of turbines?—I did not.

2481. You did not?—No.

2482. And I may take it that you were for five or six years an inspector of fisheries in the employment of the Conservancy Board, with all this knowledge of the destructive tendency of turbines, and knowing that there were a great number of turbines in your district, without drawing the attention of the Board or its officials to the destruction that was going on?—I never suggested proceedings of any kind to them.

2483. Did you ever suggest there was any destruction going on?—I never did.

2484. And it was not until 1885, when you received instructions to put these clauses in force, that you reported upon the destruction; or did you then report on the destruction?—No, I did not.

2485. There are some water bailiffs I suppose under your control, are there not?—There are.

2486. Have any of them called your attention to the destruction of salmon fry by turbines?—Yes.

2487. Who?—A man called William Irwin.

2488. How many water bailiffs are there under your control?—Eleven.

2489. Have any of the others called your attention to it?—No.

2490. Is that the only one of the 11?—Yes.

2491. Of course those water bailiffs have more opportunity of watching the river closer than you have, have they not?—I do not think they have; I give all my time to it they do not.

2492. Are you of the opinion that you are much more acquainted with the rivers in your neighbourhood than any one of the water-bailiffs?—Yes.

2493. Are you often there?—Yes. I visit all the rivers more frequently than the water-bailiffs.

2494. When was the first occasion that you discovered fry below Mr. Webb's mill?—That was in the month of May 1890, I think.

2495. Was that the first occasion you had ever seen fry killed there?—It was the first occasion I ever looked for them.

2496. Had you ever heard of their being killed before then?—No, I have not.

2497. But you looked for them in May 1890; where did you find them?—In the tail race leading from the turbine.

2498. Do you remember the dates?—I do not.

2499. It was the end of May, was it?—It was some time about the latter end of May.

2500. Was that the only occasion?—On two occasions I was there.

2501. Were they both at the end of May?—Yes, within a few days.

2502. Was it above the bridge?—Yes, between the bridge and Mr. Webb's works.

2503. There are two tail races there, are there not?—Yes, but the two tail races converge into one.

2504. But you say it was above the bridge?—Yes.

2505. Which of the tail races was it you found them in?—The one next the river.

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Mr. Macartney—continued.

2506. Whereabouts did you find them in that tail race?—I could not really say; it might be 10 or 12 perches from where the turbine was situated, it might not be so much.

2507. You said five or six perches when you were last giving evidence, but now you say 10 or 12 perches, do you?—I have been thinking over the matter since, and I think it might be 10 or 12 perches.

2508. How did you get them out?—I went in at the old walls where the place was burnt, which Mr. Webb spoke about, and remained at the arch until the water was turned off.

2509. You went in where the old mill was burned; and did you wade up?—No, I went in and waited until the water was turned off, and when the mill workers passed me I came out and went up to the bridge which leads to where some of the workers live; then I got down on the soft bank and I saw a great number of the fish coming down all squeezed and bruised.

2510. Could you see the fish through the water distinctly?—Yes; then I got down at the side and brought away seven with me, and three or four days after that I called again and brought away four or five more.

2511. Was that below the arches or were you on the other side of the arches; were you inside the gate there, because that turbine is locked off, is it not?—Do you mean the turbine on the right-hand side.

2512. No. You say you found these in the mill race of the factory turbine?—Certainly.

2513. Not in the beetling?—No.

2514. Now was it above or below the arches that you were?—Below it.

2515. How did you get them out of the water?—There was no water in the race.

2516. No water at all?—There were little hollows filled with water.

2517. Did you lift them out with your hands?—Yes, when they were lying dead.

2518. Do you say that you could not have seen fry going down that tail race when the mill was working?—I do.

2519. Do you undertake to tell the Committee that that is a deep tail race?—I undertake to tell the Committee that I believe when it is worked—

2520. I do not want your belief. Do you tell the Committee that that is a deep tail race or not?—There might be about two or three feet of water or more; I never measured it.

2521. Do you know what the depth of it is?—No, I do not.

2522. Do you say it is not a clear tail race?—It is not.

2523. Do you wish the Committee to understand that you on the occasion that you were invited by Mr. Webb or at any other time, would not have been able to see salmon fry coming down owing either to the depth or the thickness of the water?—No, I could not.

2524. Do you say that you cannot see every pebble on the bottom of that race?—You cannot.

2525. You cannot?—No, you cannot.

2526. Are you sure about that?—Quite certain; the only place in it that is any way clear

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clear is the portion immediately above the bridge.

2527. Do you say it is not clear just below the turbines?—It is not.

2528. What did you do when you got this fry at the end of May?—I took them home.

2529. Did you show them to anybody?—I did.

2530. Who to?—I showed them to the family at home.

2531. Did you show them to anybody else except your family?—No, I wrote to one of the Board of Conservators stating that I had got them.

2532. Did you show them to any of the water bailiffs there?—I did not.

2533. Did you say anything about having caught them to the water bailiffs in the district?—No; none of the water bailiffs knew I was there.

2534. Did you take them into Mr. Webb?—I did not.

2535. Did you say anything to Mr. Webb about having caught them there?—Yes I told him some time afterwards.

2536. But you did not take them in at the time?—I did not.

2537. Nor did you show them to anybody in Randalstown?—I did not.

2538. You took them home and showed them to your family?—Yes.

2539. That was the end of May 1890 I understand?—Yes.

2540. How soon after did you communicate the fact of having found those dead fry there to the Conservancy Board?—I did not report to the board; I wrote to a Mr. Craig, who is a member of the board. He said it would be well to look and see.

2541. But do you make the reports to any member you chose or to the board as a whole?—To the board as a whole.

2542. Through the secretary?—No, just to the board; the chairman generally, whoever he may chance to be.

2543. Then you did not make any communication on this occasion you say?—No, because the next meeting of the board was not held till the following October.

2544. When did you write to?—Mr. Craig.

2545. Where does he live?—At Coleraine.

2546. What was the date of your letter?—I think it was on the following day or a day or two after that.

2547. You said you found some salmon fry killed in another place?—Yes, at Harpinstown Mill, which I think belongs to Fraser and Houghton.

2548. Did you call the attention of the owner there to the fact?—No.

2549. Were they only salmon fry?—Yes, salmon fry.

2550. Were there no large fish?—No.

2551. Did you call anybody else's attention to it?—What did you do with the fish you got there?—I brought two of them home with me.

2552. Did you show them to anybody except your own family?—No; in fact I ate them.

Mr. Macartney—continued.

2553. Did you mention the matter to the owner of the mill?—I did not; I mentioned it to his foreman, a man called Irwin.

2554. On that occasion?—Yes, he was there cleaning the woods out of the grating at the time.

2555. Now you say there were large salmon killed at Mr. Black's tail race?—Yes.

2556. When was that?—I have got them there repeatedly; I cannot remember the exact day, but I think it would be early in November.

2557. Did you mention that to Mr. Black?—I did not. I did not see Mr. Black at all.

2558. Did you mention it to anybody there in authority?—Not to any one.

2559. Did you mention it to nobody at his mill?—No.

2560. What did you do with those salmon?—I brought one of them home; the other two that I got were decomposed.

2561. Did you ever get any before last year at Mr. Black's?—No, but some of the police did, and reported the matter to me.

2562. When?—About two years ago. When Sergeant Gray was there, he got them repeatedly.

2563. Did you report that to your Board?—No, I did not. The water keeper has got two more this season at Mr. Black's mill.

2564. I want to ask you a question about the American weed. Do you wish the Committee to understand that in your view it is not injurious to salmon?—I have had every opportunity of knowing whether it would or would not be, and I am as much along the river as any other man I am sure. I have never seen any fish entangled in it, and never heard of it all of it being poisonous.

2565. Therefore, do you believe it does not do any harm at all?—I am certain it does not.

2566. And if the Inspectors of Fisheries in Ireland said so, you think they would be wrong, do you?—If they said it poisoned them, I think they would be wrong.

2567. Did you ever hear of a gentleman called Mr. Frank Backland?—I have not; not to my knowledge.

2568. He was a very eminent scientific gentleman and a great naturalist, and he was strongly of opinion that American weed was one of the most injurious things to salmon in any river, but you do not agree with him, do you?—I have never seen any injury done.

2569. Do you think he is wrong?—I should like to be convinced by practical experience.

2570. Would not his reputation convince you?—I do not know anything about him.

2571. With regard to the Six Mile Water, you say there is no salmon in it now?—None.

2572. You attribute that to the destruction by turbines and the poisonous matter from the paper mills there, do you?—Yes, principally from the poisonous matter.

2573. Which did most harm there, the turbine or the paper mill?—The paper mill I believe.

2574. Do you say the turbine did any appreciable harm there?—I have never seen any done, but I have heard of it.

2575. Supposing

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Mr. McCarthy—continued.

2575. Supposing the turbine had not been there at all, do you think there would have been salmon there with the paper mill going on?—I think not.

2576. Then so far as the Six-Mile Water goes, we may take the turbines out of your evidence as having done any injury?—So far as I know.

2577. I mean to say that there are people there putting poisonous matter into the water, and apart from the turbines you think that that would have been sufficient to kill all the fish, do you not?—I believe it would.

2578. You told the Committee that lattices were kept up in 1890 and 1891?—Yes.

2579. Do you wish the Committee to believe that in your opinion those lattices were up all the time?—I do.

2580. Have you heard the evidence of the millowners here, who said that they never kept up the lattices at all except when the inspectors or water bailiffs were coming to their mills?—Yes, I did.

2581. And do you wish the Committee to believe that that evidence is not true?—I do not know.

2582. Are you prepared to say that those lattices were kept up continuously?—I am prepared to say they were always there when I was there.

2583. How often were you there?—I was at some of them seventeen times in three months.

2584. But that would not account for the whole of the time, would it?—It would not.

2585. And I suppose you are fairly well known, are you not?—Yes, I am.

2586. I suppose your face is familiar to the mill-owners as well as the mill owners?—I believe it is favourably known.

2587. And it is quite possible to tell when you are coming, is it not?—No, I have been there at night when no person could have seen me; and I have come by such a route that they could not have known I was coming until I was on the place.

2588. Do you mean to say you could have got to the turbines without your being known to be on the premises?—Yes, I am certain of it; I was there at night when no person knew I was there, and left without any person knowing I had been there.

2589. Were the mills working then?—They were.

2590. What mill was this you were at which was working at night?—Fraser and Haughton's of Harpinstown. That was working at night when I was there, and I believe there is only one man remains there at night, and I am confident he did not see me.

2591. Is there a turbine there?—Yes.

2592. And you found a fry-guard in front of it when you were there, did you?—Yes.

2593. What was the date of your visit?—I did not mind.

2594. I must ask you to say because there is a conflict about it?—Either in the month of March or April.

2595. What year?—1890 and in 1891.

2596. Both in 1890 and 1891 you visited Fraser and Haughton's mill at night and inspected the turbine and found a fry-guard in front of it, did you?—Yes.

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Mr. McCarthy—continued.

2597. And the mill was running, was it?—Yes.

2598. Is there any other mill you have visited?—Yes.

2599. And saw the fry-guard up?—Yes.

2600. In front of the grating?—Certainly; I lifted it up and put it down again.

2601. Do you know of any other mill?—Yes, Fenaghy, Mr. Maclean's mill. I was there three nights during the months of March, April, and May 1891, and found the fry-guard up all the time. I was at Mr. Field's twice at night, and found a fry-guard up.

2602. Do you say that Mr. Gault kept it up?—I do not know whether he did.

2603. Do you say Mr. Arthur kept it up?—It was always there when I was there.

2604. But not at any other time, do you say so?—No.

2605. You are not prepared to dispute the evidence which was given, are you, that the mill-owners only kept them up when you or your water bailiffs, or some one on behalf of the Conservancy Board, were about to appear on the scene?—I am not prepared to dispute that.

2606. Do you wish the Committee to understand, apart altogether from a fry-guard being blocked up like that one with debris, that it would have no effect on the water, and that it would not check the current made of proper material?—If a fry-guard was put with it, it would not.

2607. I am talking of a fry-guard like that one in the room?—It is not necessary that one like that should be up.

2608. What sort of a one is the proper one?—A larger wire than that would have done, but if a perforated plate such as that at Mr. Geoghan's was put up and put up immediately behind the grating which they have for their own protection, I am quite confident it would do no harm. I would risk a positive hundred pounds to test the matter.

2609. Then do you disagree with the evidence that has been given on that point?—I do; if the matter was fairly tried it would injure no mill and it would protect the fish.

2610. Now I want to ask you a question about Mr. Geoghan's mill. You say he has a grating at the tail race, do you?—Yes.

2611. Is it there now?—I do not know; it was there in the months of September, October, November and December.

2612. Did you hear his evidence with regard to that grating?—I did.

2613. Did you hear him say that they were finding out every day what an inconvenience it was and what an injury it was to the running power of their mill?—Yes, I heard him say so.

2614. I do not want to go into the matter fully, but with regard to the evidence which you have given as to the prosecutions, you were called as a witness I think before the county court judge on the appeal, were you not?—Yes, I was the only witness.

2615. And he reversed the decision of the magistrates on the merits of the case; is not that so?—I do not know. I think he stated that he had no engineering evidence before him and it would have to be proved before him that the machine was so constructed that it was injurious

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Mr. Newbore—continued.

In its nature. I was not prepared to give that evidence.

2616. You had called no engineering witness, had you?—No.

2617. You are not prepared to say he did not dismiss the matter on its merits, are you?—I am not. I believe if he had had engineering evidence before him he would have confirmed the decision of the court below; I am prepared to state that.

2618. You are prepared to state what?—That if he had had engineering evidence to satisfy him of the injurious nature of the turbine he would have convicted.

2619. But your evidence did not satisfy him, did it?—No.

2620. There is a slight discrepancy about the dates of serving the notices on Mr. Webb, which is not very material. Before you served any summons on Mr. Webb, did you ever draw his attention to the fact that he could get an exemption?—I told him there was no way out of it unless he had an exemption.

2621. Was that before you summoned him at all?—Certainly, and I even told his clerk that he should apply for an exemption.

2622. We had evidence from you that until the year 1889 there was no action taken by your conservancy board with regard to turbines?—No, no action was taken.

2623. That is as far as your knowledge goes?—That is as far as my knowledge goes.

2624. And the Turbine Act was passed, was it not, in 1863?—I do not know.

2625. I have it in my hand and I call your attention to the fact that it was passed in 1863?—That is right.

2626. When did you first come into the service of this conservancy board at Coleraine?—Eight years ago last December.

2627. As far as you are aware, with the exception of the single notice that has been served on Mr. Webb in 1889, which was followed by no proceedings, your board took no action at all, did it?—I do not know; I can only speak for my own district. I received no instructions to take any proceedings previous to 1889.

2628. And then you received instructions, did you?—Yes.

2629. You had made no report, had you, with regard to the destruction of salmon fry by the turbine to your board?—I have talked to different members of the board, but I have made no report on the matter.

2630. Who had you mentioned it to?—I had mentioned it to a Mr. Craig.

2631. When?—A number of years previous; about a year after I was appointed; I also mentioned it to a Mr. Moore and another gentleman also.

2632. You have given in evidence before the Committee an expression of astonishment that the millowners had not applied for exemptions; had the conservancy board ever taken any steps against millowners which would have necessitated exemptions being applied for during the whole of the years which had elapsed between 1863 and 1889 or 1890?—No.

Mr. Macarty—continued.

2633. Had they interfered with the working of the mills?—No, they had not.

2634. In any way whatever?—No, in no way whatever, but I had called upon them repeatedly before that, and told them it was necessary that they should comply with the section of the Act.

2635. When?—The last five or six years.

2636. What section?—The section that deals with gratings at head races and tail races. I have even read it to them, and a number of them stated they would comply with it, but they never did it.

2637. But the conservancy board never took action, did they?—No, they did not. I never received instructions to proceed against any one until 1889.

Mr. Cox.

2638. Are any of these mill races without bye-washes? Does the law compel the owner of a mill to put up a bye-wash?—Not that I am aware of.

2639. Then are there a good many of these mill races without bye-washes?—There are some of them; I can give you the names.

2640. I do not want the names; you stated in your evidence, in corroboration of Mr. McDermott, that the fry never turn back in going down to the sea?—I have never seen them, and it is generally understood that they do not.

2641. In fact you say they are like sheep, and will pass all resistance?—They will, if they can get water.

2642. Do you corroborate Mr. McDermott that they never turn back?—I do.

2643. Supposing one of these mill races is a long race, and the fish come down there, what is going to happen to them if there is no bye-wash?—A bye-wash should be constructed.

2644. But the law does not compel it, does it?—I do not know that.

2645. I thought you said it does not?—I do not know that.

2646. Then if there is no bye-wash, the fry would stop there their natural lives; they are so pig-headed in their instincts that they would not go back, would they?—That is my opinion; I have seen them above the screen.

2647. And stop there?—Then when the mill is stopped they get out through the bye-wash into the river, where there is a bye-wash, and there is at most of these places.

Mr. Tomlinson.

2648. You heard Mr. McDermott's evidence about the condition of the weirs in several of the rivers, did you?—I did.

2649. Is it part of your duty to observe the state of the weirs?—Yes; in going about I observe that, because there are places where we have a good deal of watching to do.

2650. Do you find the salmon crowding about the weirs when they are going up?—Yes, particularly on the Main River.

2651. Why do they?—Because the water is all lifted at the head race and taken down to the mills. There is not enough water to carry them over the weir, and then they crowd in the water at the bottom of the weir.

2652. Do you think if there were means of their

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Mr. MOLES.

[Continued.]

Mr. TIMMONS—continued.

their getting over the weirs they would prefer going up the Main River?—Certainly; you will see them trying to get over it and falling back again.

2653. Do you find a great many more salmon trying to get up a weir than you find trying to get up a tail race?—Yes.

2654. Are there any salmon ladders in the upper waters of the Main?—No, there are not.

2655. Have you ever seen a salmon ladder?—No.

2656. Do you not know what a salmon ladder is?—I do not; I have seen a fish-pass.

2657. Are there any fish-passes in the Main?—None.

2658. Would a fish-pass be an advantage in your judgment?—A great advantage. The fish would then all go up to the spawning beds.

2659. Do you think it would be worth while for the conservators to spend a little money in putting up fish-passes?—Yes, I believe it would. I am sure it would, if they had the money to spare.

2660. But have they never attempted to do anything of the kind?—No, I presume for the want of funds; and then there would be another difficulty in the way I suppose, and that is getting liberty from the millowner.

2661. Do you think that the millowners have the right to prevent fish-passes being put up at the weirs?—If they could show that in any way interfered with their supply of water and the working of their machinery, it would be an objection.

Mr. SEXTON-KERR.

2662. Do you mean under this new Bill or under the existing law?—Either under the existing law or this Bill.

Mr. TIMMONS.

2663. Do you know of any instance where the weirs have been raised in height?—Yes, I do; a number.

2664. Do you take exception to the millowners doing that?—Certainly.

2665. Have you made any objection with regard to that?—None. In some cases, where they have put boards on the top of the weir to raise more water to send down the head-race, we have objected.

2666. Have you no power legally to object to that being done?—No, none. There is a power, but there is no penalty attached to it, so that they can set you at naught.

2667. Supposing a weir was raised in height, and your conservators directed fish-passes to be put in, could the millowners stop that being done, in your judgment?—If they could show that their water power was interfered with in any way, the Board of Conservators could not enforce it.

2668. I want to ask you a question with reference to the kind of tail-race grating you described. As I understand, the bars or spikes or whatever they are, would project outwards down the stream?—Yes.

2669. Would that prevent the fish trying to go up, do you think?—Yes, it would. There should be a space of three inches left at the O.S.O.

Mr. TIMMONS—continued.

opening, and we will suppose the stream going down, and the bars put in horizontally; the leaves would run down the bars, and there would be an opening at the point of three inches.

2670. But it would not be large enough for the fish to go up, would it?—No, but they would come down, and pass through it.

2671. Do you know of any instance where a guard of that kind has been put up?—Yes; Mr. Geoghan's of Lisnasillan is of that nature.

2672. Is that on the Main?—Yes, it is on the Main. I have been very often at the place, and never seen anything wrong. There is a great fall from Mr. Geoghan's works to the point where the water returns to the River Main. In fact, before it would be running over the top of his grading, it would have flooded the whole of the land round about. I pass up that road three or four times a week, and I have never seen the place stopped in the way that has been stated here.

2673. Then I rather gather from the evidence you have given that in your judgment one of the most fertile causes of the diminution of salmon is the poisonous matter in the river from the works of various kinds?—That is a thing we can see and know the extent of, but the extent of the destruction occasioned by turbines is a thing we cannot know with any amount of certainty. We know the number of fish has decreased in my district within the last six years.

2674. Have the paper works been established during that time?—I am not speaking of the Six-Mile Water. I am speaking of those rivers where the poisonous matter is not so extensive.

2675. Which rivers are they?—The Rivers Main, Kells, Braide, and the River Clough which are all tributaries of the River Main.

2676. Is there any flax grown on the banks of those rivers?—Not nearly so much upwards as there was. In the Braide district and the Clough district last year there was not half the quantity of flax sown, and I did not see a fish poisoned with flax water all last season.

2677. Do you know the symptoms of poisoning by flax water?—Yes.

2678. Can you tell whether a dead fish has been poisoned by flax water?—Certainly. In the time of year that flax water is in the river there are no large salmon and no fry of salmon in the rivers. The salmon begin to come up in September and October, and they return in December and January, and we hardly get any of them in the upper rivers later than January. The fry are passing back to the sea in March, April, and May, and some of them remain as late as the 20th June, and we have no flax water in any of the rivers in June. It is a good way on to July before we have any, so that the fish are all away then, and no destruction can be attributed to flax water.

2679. Have you ever noticed fish depositing spawn below the weir because they cannot get over it?—Yes; and tearing one another's heads up.

2680. And that would result in their losing their spawn, would it not?—Yes, because others have hooked them up and they are carried away, and only the last lot of spawn is left. If the fish

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[Continued.]

Mr. Tomlinson—continued

that hook the other beds up could get up to higher waters they would have beds of their own.

2681. Then they disturb the beds where the fish have already deposited their spawn by trying to get over the weir themselves, do they?—Just so; they cannot get over.

2682. Do you mean that if a fish had deposited spawn below the weir because it could not get over, another fish coming there and trying to get over the weir would disturb the spawn laid by the previous fish?—I do not mean that. I mean this: a fish has spawned and covered up its spawn in the bed with gravel, and another fish that wants to spawn comes along wanting to get up over the weir, but cannot do so for want of water; that fish will turn back and turn up the spawn of the previous fish that has already spawned, and hence it is lost.

2683. Does that happen in the upper reaches of the river under ordinary circumstances?—No, because in the upper reaches of the river there are no weirs.

2684. How does one fish in ordinary circumstances, when there are no obstructions from weirs, choose its own spawning bed?—They are peculiar in that way. If the gravel is too fine they will not choose it; if it is too coarse they will not choose it. There must be a certain run or current on the water, so that when they raise the gravel the water will carry it back on each side. They turn it away with their tails, and make a little opening, as it were, in which the female deposits the ova, and the male follows and covers it.

2685. Then under all the circumstances, in the head waters of the river when one fish has spawned, another fish would not be likely to disturb it?—Not if it can get a place for itself.

Mr. O'Neill.

2686. You said, when last we sat, that there were proper gratings erected at three mills at Lismillan, at Joseph Black's, and at Fenaghy?—Yes, that is right.

2687. Then you have said to-day that you found several dead salmon in Mr. Black's tail race?—Yes.

2688. Then that cannot be a proper grating, I suppose, or the fish would not be in the tail race?—It is a very proper grating.

2689. Then how did the fish get in?—By the head race, and passed over the hucket wheel.

2690. Is there not a grating at the head race too?—No, only at the tail race. I may state also that he got an exemption as to the head race, but he was to take off the grating at the tail race in December and January of each year; but he did not do that, for if he had done that the fish would not have been caught in the grating at the tail race; they could have passed on. They were killed, of course, but I should not have got them at the grating if it had been off.

2691. Mr. Black has not a turbine, has he?—No, he has not.

2692. Does he work his mill by a wheel at all?—Yes, by an ordinary hucket wheel, or two, rather.

Mr. O'Neill—continued

2693. That is the motive power of the mill, is it?—That is the motive power.

2694. But he has no turbine, has he?—He has no turbine.

2695. You said also that in May 1890 you picked up seven dead fry in Mr. Webb's tail race, did you not?—Yes.

2696. You infer of course from that that there are a great many destroyed that you know nothing about when you are not there, do you?—Yes, I do.

2697. Do dead fish sink or float?—They will float if there is a current in the water at all; they will be carried along.

2698. I suppose there are a great many mill-race fry pass Randalstown down the Main?—I am sure there are.

2699. And if there were a large destruction of fry you would probably see them floating about in the river, would you not?—I have got them in the river immediately below Randalstown Bridge.

2700. Have you?—Yes, a great number of them.

2701. Were they floating on the top?—No, they were lying against stones.

2702. When was that?—Last year.

2703. In the river?—In the river.

2704. Below Mr. Webb's race?—Yes.

2705. Did you ever find any before that?—No, I never looked for them before that.

2706. I have lived all my life on that part of the river, and never saw one floating yet?—I have. No doubt if you will take the trouble to look in the month of May now coming, when the water is low, you will get them lying against stones on the up-stream side of the stones.

2707. Then are you absolutely certain in your own mind that a great many fish might be found in the Main that might have been killed by Mr. Webb's turbine?—I did not state that.

2708. I understood you to say that?—I have got them killed in the river, but I do not know whose turbine they were killed by. I presume they were killed by turbines, for I know of nothing else to kill them.

Mr. Finlerton.

2709. You say you have been an inspector of fisheries for about eight or nine years?—Yes.

2710. What were you before that?—I was a constable in the constabulary.

2711. How long were you a constable?—Nine years.

2712. That is a matter of better than 17 years since you joined the force, is it not?—About that.

2713. You say you were acquainted with the turbine wheel 20 years ago?—I do.

2714. What were you doing then?—Working with my father at home.

2715. How did it happen you were taking an interest in the matter of turbine wheels then?—I was not taking an interest in them at all; it was talked about.

2716. By whom?—By the neighbours.

2717. And with a sort of prophetic instinct you turned your attention to turbines at that early date, did you?—No, I did not. I am telling you the circumstances.

2718. You

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[Continued.]

Mr. Pinkerton—continued.

2718. You also in your evidence state that one of the 11 water bailiffs under your control stated he had seen a fish killed by a turbine?—Yes.

2719. You have stated you have found fish killed at Harpinstown, have you not?—Yes.

2720. Did you report that to any member of the firm there?—No, only to the man who was present.

2721. Did you make a statement to anybody who was present?—I told the man Irwin.

2722. What was the date of this?—I do not mind; it is about two years ago in May or June next.

2723. You wrote a description to Mr. Craig, of Coleraine, about what occurred at Mr. Field's mill, you say?—I wrote and said that I had got fry in the tail race, and that I had no doubt they were killed by the turbine.

2724. Is Mr. Craig a conservator?—He is.

2725. Where does he live?—Cutts House, Coleraine.

2726. What profession does he follow?—I do not know that he has any calling; I am not aware of any.

2727. I am not aware of any man of that name there?—He is a well-known man at Coleraine, and he is a very popular man there.

2728. You mentioned the fact of a number of dead fry floating upon the top of the stream during the month of May; have you heard of any of the water-keepers poisoning the river for the purpose of destroying the pike?—No.

2729. Have you never seen it done?—No.

2730. Are you not aware of its ever having occurred?—No, I am not; I never knew the river to be poisoned by any water-keeper.

2731. Do you think the pike have increased in quantity or not?—The pike have decreased in quantity.

2732. In your opinion the Canadian weed has no injurious effect on the fish, has it?—That is my opinion.

2733. You are not satisfied, are you, with regard to the action of the inspectors of fisheries?—I have no feeling in the matter.

2734. You stated that you were surprised that the millowners did not apply for exemptions?—I do not know that I stated that I was surprised about the matter. I think I stated that if they had applied when I asked them to do so in many cases they would not have been summoned. They appeared to set the matter at naught.

2735. Suppose that every millowner on these streams, the Bann, the Keshwater, and the Main and its tributaries, had applied for exemptions, and obtained these exemptions, what would the effect have been; how could it have differed in any degree from the effect of this proposed Bill if it becomes law?—It would be necessary, I think, they should understand the nature of the fish, and that when they came up the river to spawn they would require the gratings up. The inspectors have given exemption to almost all the millowners for all the season but when fish are going up to spawn, and in those months they require them to put up the gratings to prevent them getting in about their mills.

2736. Do you say the effect of the passage of 1880.

Mr. Pinkerton—continued.

this Bill would be to destroy the salmon fisheries and these breeding grounds?—Certainly.

2737. Are you aware that this Bill is not framed for the purpose of preventing proper safeguards being erected?—I think it permits safeguards to be erected at the expense of the board.

2738. And are you of opinion that, if safeguards are erected at the expense of the board, the effect will be to destroy the fisheries?—My opinion is that if they are to be erected at the expense of the board they will never be erected, because they have no funds to do the work.

2739. Then the millowners are to supply the owners of fisheries with funds to safeguard their own interests, are they?—My opinion is this, that the millowners take the water from this river for their own purposes and to benefit themselves. If there was any interest in that river, I hold that they should protect whatever interest there was in it, whoever it belonged to.

2740. Did you ever take the trouble of examining any of the leases of the millowners?—No, I know nothing at all about it.

2741. Do you know that under those leases they have power to take the entire water of those rivers?—And they still have power, and we do not want to interfere with them; but we should not be interfered with either.

2742. Do you know that it is leased to them, and that they pay for the privilege?—I expect so.

2743. And you ask them to pay for the privilege, in the first place, and deprive them of it in the second, do you not?—As to the legality of the matter, I am not prepared to go into that.

Mr. SEW-KERR.

2744. Mr. Macartney asked you why you did not report the destruction of fish by turbines two or three years ago; I wish to ask you, was it not at that time a matter of notoriety that fish were killed in turbines?—Certainly, it was talked of amongst members of the board.

2745. It was a matter of common knowledge all through the neighbourhood, was it not?—It was.

2746. It was not in the least necessary for you to make any report, and you were not expected to make any report of that kind, were you?—No, it was a well-known fact.

2747. The action taken by the conservators in, I think, 1889, was, I believe, taken in consequence of the increase in the number of turbine wheels, was it not?—Yes.

2748. They were increased at that time, and the conservators thought they were bound to take some action in the matter, did they not?—A great many of the millowners were putting up turbines in place of the common bucket wheel, and the fish were decreasing, and we had no doubt that it was that which caused them to decrease.

2749. That happened, I believe, about 1888, did it not?—A great number were put up in 1888 and 1889.

2750. Before that period not so much was known about turbine wheels, I take it, and not so much attention had been attracted to them, had there?—No. I may state that a number of the anglers

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anglers

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Mr. MOLES.

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Mr. Seton Karr—continued.

anglers who were going about the rivers continuously had noticed these things, because in the month of March the angling season opens, and the fishermen are going about the rivers in March, April, May, and June; they would be constantly about, and would notice all these things, and I have had, I suppose, 50 letters on the subject from anglers speaking of the destruction that was done by turbine wheels to young fry.

2751. These anglers stated in their letters, did they, that they had seen the dead bodies of the young fry?—Just so.

2752. How many letters did you say you had had?—I have had 50 letters during the last five years.

2753. I forgot to ask you one question. I think you said there were no weeds in March, April, and May, going down the river. As a matter of fact, the winter floods, I suppose, clear out the river, and there is no loose debris lying about to come down?—There is not.

2754. Is that one reason why the gratings are not likely to be clogged up or stopped by debris in those months, March, April, and May?—That is true.

2755. Is that a fair way of putting the case in that respect?—Yes; there are no leaves falling in March, April, or May, because they fall in the autumn, and all the decayed matter along the banks of the river is carried down by the winter floods and swept away on to the sea; in the months of March, April and May, when the fry guards are required to be put up, there is neither grass-cuttings in the district, nor are there leaves falling, nor any other matter coming down the river. The only thing that may be coming down the river, and what a great number of the mill-owners complain of is, the refuse of linen and other works; little fibres coming from other works and mills above them and collecting upon the fry guards.

2756. What they complained of was, was it not, that the mills above them did not dispose of their refuse, but allowed it to go into the river?—They had no convenient way of disposing of it, only by letting it into the river.

2757. Can you, as a fishery inspector, suggest any remedy for that, or any way by which the mills could dispose of their refuse without turning it into the river?—To prevent it going on to another mill, do you mean?

2758. Yes, that is what I mean?—There could be some coarse grating put up that would catch this fibre at their own tail races immediately at their works, where one of their own hands would be handy to clean it.

2759. But the natural debris, you say, does not come down the river at the time you mention?—It does not.

Mr. O'Neill.

2760. You said you suggested to each mill-owner before he was summoned that he should apply for an exemption?—I did.

2761. Was that because you thought the putting up of the gratings would interfere with the working of the mill, or why did you make the suggestion?—I simply read the section of the Act of Parliament bearing on the matter, and I said, "There is no way out of this. I will

Mr. O'Neill—continued.

have to bring you into court unless you obtain an exemption." Of course I did not know what the inspectors of Irish fisheries would do when they came to inspect the place, whether they would give an exemption or not; and, speaking generally from other cases, I was of opinion possibly they would give them an exemption.

2762. It was not because you yourself thought the grating would interfere with the working of the mill, was it?—I was not giving that matter any thought at the time.

Mr. Pinkerton.

2763. Did you read the evidence given at Belfast by Mr. Michael Brown, the head water-keeper?—I heard the evidence.

2764. Is it not the fact that Mr. Brown said he had never heard of fish being killed by turbine wheels?—Possibly it may be; I do not mind what evidence he gave.

2765. He has been longer connected with that business than you have, has he not?—I believe Mr. Brown's experience in that matter is very very small. He is employed on other things, and I have been there repeatedly and never caught the man looking after his duty.

2766. Did you hear the evidence of Mr. Lang, ex-sergeant of police?—I heard all the evidence, brought up on Mr. Webb's side, which was very numerous. He had engineering evidence also.

2767. Did you hear Mr. Lang's evidence?—I do not mind the man, but I heard all the evidence.

2768. Did you hear him swear he never heard of fry being killed by turbine wheels?—I believe he did.

2769. Do you know Mr. Currie, the well-known angler?—I do.

2770. Did you hear him state that, to the best of his opinion, fry were not killed by the turbines?—I cannot mind what evidence he gave.

2771. I suppose, as you attach so little importance to Mr. Buckland's opinion, you will not attach much importance to Mr. Currie's?—I am not expressing an opinion either way about any of the evidence.

2772. Those men are all better acquainted with the business than you, and are greater authorities on the subject, are they not?—I question very much whether any you have mentioned are better acquainted with the matter than I am.

2773. Are you prepared to admit they may be as well acquainted with it?—They may be.

2774. And their evidence is flatly contradictory to yours, is it not?—I am not contradicting their evidence. I am simply stating what I know.

2775. Did you hear this evidence?—I heard all the evidence at Belfast and Randalstown, and the magistrates convicted upon my evidence at Randalstown.

2776. In one case, and they rejected your evidence in another?—No, they did not; it was for want of additional evidence.

Mr. Cox.

2777. Do you consider Sir Thomas Brady a good authority on all questions relating to salmon?—I would.

2778. Was

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Mr. MOLES.

[Continued.]

Mr. Cor—continued.

2778. Was there any conflict of opinion between you and him when you met him at Mr. Webb's mill?—No, we did not come to any point upon that.

2779. Did you on any subject at all?—No, that was not entered into between us.

2780. Was there any difference of opinion between yourself and Sir Thomas Brady on that day at Mr. Webb's?—No, there was not.

2781. If Mr. Webb said there was a considerable difference of opinion, would he be wrong in so stating?—I should have to go into a

Mr. Cor—continued.

subject which perhaps would not be pleasant, to answer that.

2782. I simply want to ask the question; as to the grating or anything in connection with Mr. Webb's mill, was there any serious difference of opinion between Sir Thomas Brady and yourself?—I was of opinion that gratings should be erected at the tail race to prevent fish getting up Mr. Webb's tail race. Sir Thomas Brady and the other inspectors gave an exemption for that, hence I hold that they were of a different opinion from me when they did so.

Friday, 29th April 1892.

MEMBERS PRESENT :

Sir John Whittaker Ellis, Bart.
Mr. Hosier.
Mr. Macartney.

Mr. T. W. Russell.
Mr. Seton-Karr.
Mr. Tomlinson.

SIR JOHN WHITTAKER ELLIS, BART., IN THE CHAIR.

Mr. T. G. PALMER HALLETT, called in; and Examined.

Mr. Seton-Karr.

Mr. Seton-Karr—continued.

2783. You are a Barrister-at-Law, I believe, and a Justice of the Peace, of Claverton Lodge, Bath?—Yes.

2784. And of the Fishery, Galway?—Yes.

2785. Were you formerly High Sheriff of the county of the town of Galway, and a member of the Boards of Conservators of Fisheries of Galway and Somerset?—Yes; am now a conservator in Galway, and also of three river districts in Somerset and the adjoining counties.

2786. You have read, of course, Mr Macartney's Bill carefully, have you not?—Yes, very carefully.

2787. It repeats 26 & 27 Vict. c. 114, s. 30, does it not?—Yes.

2788. Do you attach very great importance to that section?—That is the clause with regard to exemption, is it not?

2789. No, that is the turbine clause which compels mill-owners to fence in their turbines or other hydraulic machines. Do you attach much importance to that clause?—I do; great importance.

2790. Are you prepared to show the Committee that those who are in favour of repealing that clause have not in your view fairly represented the effect of the clause, or the result of repealing it?—I think so.

2791. Will you kindly tell the Committee shortly what you consider to be the effect of that clause?—I think the effect of the clause is this, that you must first of all prove injury to the salmon. The clause says, "Where a turbine or similar hydraulic machine which may be injurious to salmon or the young of salmon," and so and so, and then goes on to give the time and the penalty, and also says, "a sum not exceeding 5*l.* for each day during which such injury to the fry continues." My position is that you have first of all to prove that the turbine is injurious before you can convict the miller. That is my position, and the burden of proof moreover rests on the salmon interests.

2792. And you also have to prove that such injury to the fry continues, have you not?—Yes; so in case the turbine is not injurious to salmon the question falls. It is not necessary to repeal the clause because it does not apply.

2793. Then do you say shortly that if turbines are shown not to be injurious, then the turbine clause does not apply, and there is no necessity for repealing this clause?—Quite so; that is my position.

2794. And also you further point out, I believe, that the burden of proof of injury rests on the salmon interests and not on the mill interests?—Yes, that is how I read the clause.

2795. On the other hand, I believe, you say that if turbines are injurious then millowners, by repealing the clause, practically claim the right of injuring salmon and fry with impunity?—Yes, that is to say they claim the right of setting up a destructive machine: it may be a turbine or any other hydraulic machine, which may injure the salmon with impunity.

2796. What will be your position as fishery owners in the event of this clause being repealed and Mr. Macartney's Bill being passed in its present form?—That goes into the clauses of Mr. Macartney's Bill I apprehend, which purports to be the same as the English Act. It is not the same by the way; there is a considerable amount of difference between this Bill and the English Act. But by it any amount of mills might be set up and any amount of hydraulic machines might be set up, and the rivers practically invaded in this sort of manner, and we should have no remedy whatever unless the conservators put up gratings of their own will and accord.

2797. You say that your existing protection would be taken away and no other adequate protection would be supplied, do you?—No other protection would be supplied. This is not as good a protection really as the English Act. There is a considerable amount of difference between this and the English Act, but even the English Act would be no adequate protection.

2798. With regard to Section 4 of 32 and 33 Vict. c. 9, I want you to explain to the Committee exactly what you take to be the effect of that clause. That is the clause as to the duty of the millowner to fence in his mill and machinery by gratings to prevent damage to the salmon?—In order to go fully into the matter we must refer to Section 76 of 5 & 6 Vict. c. 106, the great Act of 1842. You can only understand this clause, I think, by reading it in relation

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Mr. Seton-Karr—continued.

to that clause. You see a certain exemption of moving machinery in Section 76 of the 1842 Act is done away with in this Section 4. But in doing away with that exemption the clause saves the effective working of the machinery. That is the important point I wish to impress upon the Committee, namely, that Section 4 does not compel a millowner to put up a grating, if that grating may ruin his machinery. It saves the effective working of the machinery.

Mr. T. W. Russell.

2799. Will you read the clause?—This is Section 4 of 32 & 33 Victoria; "In the construction of the said 'Salmon Fishery Ireland Act, 1863,' and the Acts to be construed therewith, the exemption from compliance with the provisions of section seventy-six of the Act fifth and sixth Victoria, chapter one hundred and six, of owners, lessees, occupiers, and other persons in respect of watercourses, cuts, channels, or sluices, where such watercourses, cuts, channels, or sluices are constructed for the purpose of conveying water from any river frequented by salmon as a moving power for machinery shall be deemed to extend, and shall extend only to such cases in which and for such periods during which it shall be proved to the satisfaction of the said inspectors of fisheries that such exemption is necessary for the effective working of any such machinery." I am interested in the clause, because I believe my father-in-law had something to do in conjunction with fishery inspectors, with passing it. But I want to impress on the Committee that the effective working of the mill machinery is saved by the clause.

2800. At the discretion of the inspector of fisheries?—Not at his discretion. It is a perfectly judicial act on the part of the inspectors; if you are not satisfied with the judicial tribunal of inspectors you could get another; it is not a discretion at all.

Mr. Seton-Karr.

2801. An appeal to a higher court might be granted, might it not?—If necessary.

Mr. T. W. Russell.

2802. Who from?—I only say it might be.

2803. That comes to discretion in the end, does it not; if you have a court from which there is no appeal, and you get a single man to construe an Act of Parliament, after all it comes as a matter of fact to that man's discretion, does it not?—Only in the sense in which you may say certain cases are decided by magistrates in their discretion.

2804. It is a judicial discretion, and there is an appeal from magistrates?—In certain cases there is no appeal from magistrates.

Chairman.

2805. How can that clause be enforced; you see some of these people have been summoned for not complying with the requisitions in the Act, and this I understand is a clause which would be dealt with in the same way?—This is the exemption clause.

2806. Is that the English Act or the Irish Act?—The Irish Act. It says, "such exemp-

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tion is necessary for the effective working." My position is, the exemption depends on the interpretation of what is meant by effective working.

Mr. T. W. Russell.

2807. The Act of 5 & 6 Victoria is the Act which compels them to put up gratings, is it not; Section 4 of the Act of 1869 says: "In the construction of the said 'Salmon Fishery (Ireland) Act, 1863,' and the Acts to be construed therewith, the exemption from compliance with the provisions of section seventy-six of the Act fifth and sixth Victoria, chapter 106, of owners, lessees, occupiers, and other persons in respect of watercourses, cuts, channels or sluices, where such watercourses, cuts, channels or sluices are constructed for the purpose of conveying of water from any river frequented by salmon as a moving power for machinery, shall be deemed to extend, and shall extend only to such cases in which and for such periods during which it shall be proved to the satisfaction of the said inspectors of fisheries that such exemption is necessary for the effective working of any such machinery." Then it comes simply to this, does it not, that the inspector of fisheries must inspect and act upon his opinion?—Quite so. But my proposition is that it is a judicial duty.

Mr. Macartney.

2808. You do not mean the Committee to understand, do you, that you are representing the view of the inspector of fisheries or the practice of the board; it is only your interpretation?—Quite so. My interpretation is that the inspector is an interpreter of the words "effective working."

2809. You do not say it is the view of the inspectors, do you?—I know nothing about the inspectors; of course I cannot say that. I say that is the way in which we have always understood the Act.

Mr. T. W. Russell.

2810. Assume now that the inspector is sent for, and that he goes down to inspect one of these mills where the exemption is claimed, and he decides that he can grant no exemption. The millowner is powerless under the present law, is he not?—I do not know that there is any appeal from inspectors. In many respects where an inspector has to decide in that manner there is an appeal from his decision; I do not know that there is any power to traverse the decision of the inspector; but such power of appeal might be granted without repeal of the clause.

Mr. Seton-Karr.

2811. That is your view, is it, of the wording of the clause; you say that the inspector of fisheries would have to judge according to the evidence brought before him?—Quite so; it is a case of evidence; that is what I mean. It is not a case of discretionary administration; it is simply a case of judicial evidence and the legal interpretation of an Act; that is my position.

2812. As a matter of fact can you tell the Committee of any case in which there has been satisfactory evidence shown that exemption was required, and that exemption has not been granted; do you know of any case of that kind?—I do not know of any case of that kind.

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2813. You

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Mr. Seton-Karr—continued.

2813. You have heard the evidence of Mr. Webb and other witnesses, have you, or have you read it?—I heard some part of the evidence, and I believe there were some cases mentioned in which exemption was granted.

2814. You have no reason to suppose that exemptions are not freely granted, have you?—None whatever; on the contrary, I have every reason to believe they are.

2815. There is never any difficulty, is there, for a millowner to obtain the exemption wherever there is reasonable evidence?—So far as I know, no.

2816. Did you read Mr. Webb's evidence?—Yes, I did read it, but I do not think I remember it sufficiently on this particular point to be able to say anything about it.

2817. Do you happen to know anything about the facts under which he was prosecuted against for not complying with the provisions of this clause?—No, not personally.

2818. Your contention, then, is that if this exemption clause is repealed, and also the preceding clause to which you refer, mills of all kinds will be able to destroy the up-going breeding fish and the return unclean fish and fry with impunity?—Yes, that is my position.

2819. And you think that is clearly demonstrated by the clauses of Mr. Macarney's Bill, do you?—I think so.

2820. With regard to the grating clauses, it is the fact, I think, that they did not impose specific kinds of protective construction, did they?—No.

2821. I mean like this lattice we have here?—No; there is nothing of the kind. I cannot find in any Act whatever anything laid down of this kind, and I do not see the necessity of it; certainly not for salmon nor for fry. From my experience of fry I do not see any necessity for anything of that kind.

2822. All that is imposed on the millowners is a necessity for providing safeguards against injury to fry and salmon of some kind, is it not?—Quite so; the millowner is bound to fence his mill so that the salmon shall not get into destruction. It is a case of fencing really; that is what it amounts to. A grating is nothing but a fence. A mill has to put up a grating to fence in its machinery, just as a railway puts up posts and rails on either side its line to fence in its trains. A mill grating is nothing but a fence to the mill.

2823. This point has always been regarded and discussed in previous Irish Salmon Fishery legislation, I believe?—I can give you instances upon instances where the matter has been discussed.

2824. I do not want you to weary the Committee upon this, but one or two instances I think would be desirable?—I have a number of instances here marked in the Report, for example, of 1836. There is a report from the Foyle, two from the Sligo River, one from the Moy, and others from Galway and the Blackwater. These preceded the Consolidation Act of 1842. In all these cases I can read illustrations, if you like (but perhaps it would weary the Committee), of gratings being recommended.

2825. Shortly, give the names of your references, please?—Here is an example from the

Mr. Seton-Karr—continued.

Foyle: "Mill dams are very injurious to the fisheries; there should be a grating constantly kept in the dams to prevent the fry and the soul fish from being destroyed."

2826. What are you quoting from there?—The evidence upon the Foyle fisheries.

2827. Whose evidence was it?—It is the evidence of Mr. Andrew Buist, manager of the salmon fisheries of the Bann, Foyle, and Moy.

Mr. Tindal.

2828. What do you understand by a mill dam in that evidence?—It would be something put up to keep up the level of the water in the river.

2829. To keep up the level of the water in the river?—Yes; I do not quite know what would be the specific application here; it may be a variety of things in this particular case, but I am bringing forward this to show the evidence in favour of the gratings.

2830. That is why I ask you, because I do not understand what a grating to a mill dam means?—I will take another case. "On the upper part of the Sligo River there are several mill dams which are very prejudicial. The practice of setting baskets in the mill race of the mills is prevalent. Owners of mills should be compelled to keep a close rack before the mill wheel." There is another case of an iron railing placed at the head and tail of a mill race; "There should be a small gap or sluice in the centre or deepest part of the mill dam, and an iron railing placed at the head and tail of the mill race, and also in the back, or waste sluice;" that is from the Moy.

Mr. Seton-Karr.

2831. Are not there some instances of the obligation of providing a free flow of water over the passes at certain times?—Yes, those are in the Irish Acts.

2832. With regard to the responsibility in the Act of 1842, can you refer to any instance where the responsibility of protecting salmon was imposed on the millowners?—Yes. Shall I refer to anything more about the gratings? In 1862, for example, when this Turbine Act was referred to a Committee, evidence on turbine gratings was given in the inquiry.

Chairman.

2833. Are you now quoting from a Report of a Committee of this House?—Yes. I need not read this in full, because I believe Sir T. Brady is going to be called; it is his evidence on the turbines; but there are several questions here.

Mr. Seton-Karr.

2834. Give the numbers of the questions?—Question 1315 of the Minutes of Evidence of 1862: "Now the next clause relates to the placing proper gratings to prevent the destruction of salmon by mill machinery?—(A.) Yes. (Q.) Do you think that the present water wheels are destructive to the salmon fry?—(A.) The bucket wheels are not. I think in most cases the buckets will carry the fry safely. We know as a fact that they do. (Q.) Are you aware that a new description of hydraulic machinery is coming very extensively into use?—(A.) Yes, at mills. (Q.) What is the effect of that?—(A.) That is perfectly destructive of all fish that get near it; and fish cannot escape."

2835. I understand

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Chairman.

2835. I understand this is not a new question, but that it has been long held by fishery owners, that unless a wheel with great rapidity of motion is protected it will draw in the young fry; that is, as I understand, your evidence?—Yes.

2836. I think it is very important to know that this has been discussed in previous inquiries before this, but you need not go into details. You have given us the Report of 1836, and the Report of 1862; is there another?—Yes, there is another Report almost more important, viz., that of 1869, which preceded the English Act. Reading the headings in the Index to this Report, Mr. Paterson, for example, gives "grounds for the conclusion that it should be imperative to place a grating at the head of the upper mill race, and at the bottom of the tail race;" that is Questions 385 to 395. Then, "further statement in favour of the compulsory erection of grating upon all inlets and outlets of water connected with mills, such grating to be kept clear at the miller's expense." That is also Paterson, Questions 894 to 897.

Mr. Seton-Karr.

2837. Will you read the numbers of the questions which set out in detail the evidence on those points?—385 to 395, and 894 to 897.

2838. Are there any more?—Yes; "further reference to the proposed grating at the head of the mill race; propriety of the expense of keeping it clear falling upon the miller;" that is Questions 1135 to 1142. I should like to refer to Mr. Buckland's evidence in the same Report. He alludes to one of the clauses that we are now discussing here: "Evidence as to the great importance of compulsory regulations for the provision of gratings at mill lochs, both at the head race and tail race;" that is Buckland, Questions 2033 to 2071. Then there are suggestions relative to the mode of construction of gratings. "Illustrations of the importance of preventing kells going down the mill loch;" that is Questions 2045 to 2047. I may say that Mr. Buckland at the time produced a model of a fish whose back was broken in a Galway mill, to show the importance of these gratings. The fish he said might have been worth 5*l.* 10*s.*, after going down to sea and coming up again. Then there is one other fact: "unanimity of boards of conservators on the subject of gratings; that is Questions 2039 to 2069. Then, "explanation relative to the bye-laws in Scotland on the subject of gratings; expediency of similar regulations in England and Wales, Buckland, 2053 to 2071. "Further reference to the Irish Act in the present Session, and to the provisions therein on the subject of gratings;" that is Questions 2113 to 2118. Then there are further suggestions. The subject of these gratings is quite a long one. He was examined and cross-examined, and the whole subject was gone into at the time.

2839. Can you give us some examples on the Act of 1842. I think the Committee would like to hear examples of the responsibilities imposed on mill-owners by that Act?—One great responsibility in the Act of 1842 was compelling mill-owners to erect fish-passes something very much allied to gratings in their effect. In the case of

Mr. Seton-Karr—continued.

all new mills, wherever a mill was built a fish-pass was to be made.

2840. Is there any other point you wish to bring before the Committee?—Then they were obliged to keep water flowing over these passes for certain periods every week.

2841. In order to prevent the passes being converted into traps, I suppose?—Yes, and to allow the fish to pass. I am not saying that old standing mills had to make passes, but all new mills had to make them, and there was a power moreover for the Commissioners to erect fish-passes at the old mills which the millers had to keep free. I would like also to read Clause 75 of the Act of 1842, with regard to the responsibility of millowners: "And whereas great destruction of spent fish and fish about to spawn, and of the brood and fry of salmon and other fish, is occasioned by the owners and occupiers of mills and factories catching and destroying the same by nets and various other devices in the mill leads, mill dams, and watercourses appertaining thereto; for remedy whereof be it enacted that if any person shall, at any season of the year," &c., &c. Then at the end of the clause there is a very strong responsibility, by which the owner or occupier of the mill is made responsible for the conduct of those in charge of the mill.

Chairman.

2842. Does this Act of 1842 apply to England only?—No, it is the Irish Act. I am quoting this to show the specific responsibility of millers towards salmon fisheries.

2843. But this which you are reading is not repeated by Mr. Macartney's Act; therefore I do not think it is relative?—It is only to show that the millowners are responsible in this sort of manner. I believe evidence has been given to show that millowners are not responsible for salmon in any form, which was a very remarkable doctrine, I thought.

2844. I do not think any evidence was given that they were not responsible, but that they expressed themselves unwilling to be responsible?—Just so.

Mr. Seton-Karr.] By Mr. Macartney's Act the cost is thrown on the conservators of erecting these gratings, and preserving the fry and the salmon, is it not?

2845-8. And the point of your evidence is that that is distinctly against the spirit of all previous legislation, is it not?—Yes.

Mr. Macartney.

2847. Not in England?—I am speaking of Ireland now.

Mr. Seton-Karr.

2848. Then the point of your evidence is that this Bill, if passed, would entirely oppose the principle upon which all previous legislation has proceeded on this point?—Yes; I say it would be a retrograde Act altogether with regard to the development of Irish legislation.

2849. And, practically, the effect of Mr. Macartney's Bill is to throw the costs and onus of protecting the fish on the fishery owners instead

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of on the millowners, is it not?—Quite so, the millowners being the cause of the damage to the fish.

2850. I should like to ask you a few questions about your knowledge of the mills and circumstances of the mills in the town of Galway; I believe you are well acquainted with the town of Galway?—Yes, I have lived in Galway a very long time; I go there every year also.

2851. How many mills are there there?—Fourteen.

2852. Are there any turbines?—One is now erected.

Mr. T. W. Russell.

2853. Are you referring to the town or county of Galway?—To the town. In the town of Galway there is one turbine; I do not think every one of the mills is in full action.

Mr. Seton-Karr.

2854. How many mills are there in actual operation there?—I could not tell you exactly how many there are.

2855. Are the majority of the 14 mills in operation?—I should think they were.

Mr. T. W. Russell.

2856. What kind of mills are they?—Flour mills; there are some others; there is a marble mill; certainly the majority of them are in operation; I could enumerate them; there is one jupe mill there; there is a marble mill there, and there is an electric lighting mill, which is the one that has the turbine. Then the others are corn mills.

Mr. Twiss.

2857. Is the electric lighting mill for the purpose of lighting the town of Galway?—Yes, I believe it is.

2858. Then it belongs to the Corporation, I suppose?—It belongs to a private company.

Mr. Seton-Karr.

2859. Are there more turbines which you know of likely to be erected?—I think it is highly probable; it depends rather on what the effect of this one will be.

2860. What is the length of the water-course of these mills?—They vary from about 40 to 400 yards. I may say the river comes down from Lough Corrib, and then there is a deep dam or weir, and the water goes off on either side to supply the mills, so that there are long courses on either side of the stream.

2861. Are any of them over 400 yards in length?—I should think some of them must be over 400 yards.

2862. In considering the question of protecting the fish in the Galway river, how do you protect them?—We have to consider the three classes of fish there; first of all the upgoing or breeding fish; then there is what we call the slaw. I do not know whether it is a dictionary name, but that is the common name there. They are the unclean fish that have bred there and are going back, the spent fish. Then there are the fry.

2863. Will you call the slaw kelta, which is a name we all know?—Yes.

Mr. Seton-Karr—continued.

2864. Will you explain to the Committee, from your experience and knowledge, in what way you think the mills would injure these three classes of fish if unprotected or unfenced by gratings, or have injured them in the past?—There are three ways in which the mills might injure the fish. First of all there is the mechanical destruction of fish by the wheels; secondly, there is the poaching; and thirdly, there is the obstruction. I will take them in order. In summer time there is usually very much greater draught of water coming down the mill races than in the river, and this attracts the fish up these mill races. They go up and are destroyed by the wheels. We have found from 30 to 100 fish in a year dead in the river below the mills, and this has always been attributed to the water wheels.

Mr. Macartney.

2865. To the ordinary bucket wheel?—Yes. These are the fish going up. Then with regard to the fish going down the same kind of thing occurs. These kelta are killed by the wheels. There is the case I mentioned just now, where Mr. Buckland brought a model of a kelt that was killed going down through a Galway mill.

Mr. Seton-Karr.

2866. You say that they are injured going up the mill race. We have been told by some witnesses who have been called that salmon going up a mill race and finding themselves obstructed by a wheel will drop back and go up the river again. What do you say as to that?—That is the greatest mistake in the world.

2867. That is not according to your knowledge and experience, is it?—I deny the thing absolutely. I have known salmon go up these places and remain there week after week.

2868. In other words, they run up a mill race, their instinct being to go up, and they will not turn?—They will not turn. I have often had experience of this when men have been told off to get these fish down. Some five or six would go in with a net and force the fish down before them, but even then the fish would be constantly escaping and going up again.

2869. In other words, these men with their utmost efforts with a net find it a matter of great difficulty to drive the salmon out of the mill race, do they?—Yes, it is most difficult. The attempt, too, is only possible when the mills are stopped. I have taken part in the operation myself, and when the fish have gone up I have known them to remain there week after week.

2870. Then it is clear, where you have a mill race of that description, that it is absolutely necessary to have a grating at the tail of that mill race to prevent any salmon ascending the river, from going up the mill race?—Absolutely. Then there are other reasons. For instance, poaching. First of all there is the mechanical destruction of fish by the wheel; secondly, these races are simply poaching preserves. Now a thing that occurred last year will illustrate this. Gratings were up and some person or persons unknown found in a lot of measure and other matter, which was brought down the race by the stream and broke

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broke down the grating. It was done purposely.

Mr. Macartney.

2871. Surely the conservators have power to prosecute for poaching on mill races, have they not?—Undoubtedly.

2872. We cannot strengthen the law any more, can we?—But that is just the very matter. You have power to convict the poacher when you find him, but the object of the grating is to keep the fish from going up to be poached.

2873. But surely if you know where the greatest amount of poaching is going on it does not take very much watching to watch 400 yards of mill race, does it?—But there are such a great number of mill races that you cannot practically do it; there are also these dark arches, and you would require a regiment of men to watch all these races. It is not only one race of four hundred yards, but there are a great number; they are all about the place, and sometimes, I assure you, almost murder would take place if we were to be dependent simply on water bailiffs; you could not do it.

Mr. Seton-Kerr.

2874. It is a very hard thing, is it not, to watch mill hands and prevent them poaching?—You cannot do it, they are under these arches and you cannot do it.

2875. Did you hear the evidence of the witness who told this Committee that the mill hands could, to a very great extent, poach with impunity without being caught?—There is no doubt about it.

2876. Your evidence is that the poaching does prevail to a considerable extent in these mill races, is it not?—Here is a case in point. They broke down the grating on the occasion I refer to. Hundreds of fish went up. The mills were stopped and we got down most of the fish. Then the grating was replaced, but the next night they broke it down again with the same results.

2877. This was last year, I believe?—Only last year. Then we called in the police and managed to stop it.

Mr. Macartney.

2878. When you took some steps you did stop them apparently; there are only 28 mill races after all to watch in a very short space of the river; I take it these mills are all together, are they not?—No, they are not indeed.

2879. How many miles of the river do the mills which are at work, say two-thirds, cover?—They come off the sides, you know.

2880. Exactly so, but this is a point on the question of the efficiency of the provisions against us which are taken by the conservators who have full powers, and it appears to me extraordinary that they cannot watch, we will say, taking the whole number of mills, 28 mill races. The point I want to put to you is that you are talking of the enormous number of salmon, which are very valuable fish, I presume, which are going up these mill races?—Yes.

2881. Then there would appear to be little expenditure necessary in the way of extra watching. Your calling in the police would be ample in the interest of the Board of Conservators,

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Mr. Macartney—continued.

would it not?—I do not know whether you have ever calculated the amount of watchdog required. I say all the police in Galway would not be able to watch these things.

Chairman.

2882. We may take it that poaching is carried on in these mill races?—Yes.

2883. And the grating you say prevents it?—Yes. I will give you another case, by which I think Mr. Macartney's point would be met, as to the difficulty of catching poachers in the mills themselves. It is an interesting case, because I believe it had to do with the passing of this exemption clause. A miller had set up some sort of trap in his mill, and in this trap were discovered some 20 spent fish; 20 kelts. I do not know how it was done, but the water-bailiff got into favour with one of the mill hands, who gave him a signal when the mill was shut off, and he went in and found these fish there. We have reason to believe, before this mill-grating clause came into effect, it was exceedingly common to poach these fish.

2884. You mean if a grating had been there they could not have got into the mill?—They could not have got into the mill; it is prevention instead of cure.

Mr. Seton-Kerr.

2885. As a matter of fact, does the existence of these mill races unprotected throw an enormously increased cost on the protection of salmon?—Enormous.

2886. And also it is very hard to prevent mill hands, who are constantly on the spot, and who can run in and out of the mill, from poaching, is it not?—You cannot, because a watchman cannot get into the mills; and I say the demoralizing effect is almost worse than the loss. There is no doubt there is a demoralizing effect produced on all sides of these streams.

2887. Is there not a current report in Galway that some mills used to pay their rent with the price of the salmon they caught?—Yes.

2888. Cottages on the banks there, I believe, hear a preferential rent, do they not?—That is a report, but I am told that there is a certain mill race there where they say a cottage is never vacant. This is not really evidence, I am only speaking of it as report.

2889. You speak of it as a report in the district, and we take it for what it is worth?—Yes.

Chairman.

2890. I think you have proved that the mill race is a very opportune place for getting possession of salmon?—Quite so.

Mr. Seton-Kerr.

2891. Is it not the fact that the 32 & 33 Vict. c. 9, s. 4, had its origin in these Galway experiences?—I believe it had.

2892. It was promoted, I believe, by Mr. Ashworth, your father-in-law?—Yes.

2893. The promotion was also assisted, I believe, by the late Mr. John Bright?—I believe it was. It was in connection also with salmon inspectors like Buckland and others.

2894. There is only one other point with regard to this; you spoke with regard to the obstruction caused by the mills to the migration

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of the salmon?—Yes; that is a third and very important point indeed. The up-going breeding fish get up into these mill races, or would get up into them, were it not for the gratings, and there they stay week after week until they become deteriorated. They are not much good for food, and I suspect that they are damaged as regards breeding; instead of going straight up the river to the breeding beds they are delayed in these mill races.

2895. Therefore, if there was no poaching at all, and the wheels did not injure the fish, the fact of their being obstructed in their free passage up the river would seriously injure the salmon fishery, would it not?—Yes; because the great object of all salmon culture is to get a free course for the salmon from the sea up to the breeding beds. These mill races are so many traps really which entice the fish in and detain them there.

2896. I wish to ask you one or two questions with regard to the responsibility thrown on mill-owners of protecting salmon; mills and fisheries have always been transferred, subject to the responsibility on millowners of protecting the fishing industry, have they not?—Yes. As regards gratings, millers have been subject to turbine gratings now for nearly 30 years. This law of the responsibility of mills as regards the salmon has been in existence now for nearly 30 years.

2897. It is hardly necessary for me to ask you to give instances of that; that rests on the ground, I believe, as you put it, that the working of the mill causes the necessity for gratings, and therefore the millowners should provide gratings at their own cost?—Yes, that is my position: they cause the damage, or the possibility of the damage, and they ought to make provision against it.

2898. I take it that one of the great objections of the fishery owners to this Bill of Mr. Macartney's is the fact that it denies that principle altogether, and throws the whole cost of protecting the fish on the fishery owner?—Yes; the cost of protecting the fish from damage by the millers.

2899. Practically, then, if you allow the argument that the salmon fisheries are less important than the mill-owning industry, it amounts to this, that the mills may destroy the salmon with impunity, does it not?—That is what it amounts to. They say that in consequence of the superior importance of the mills they have no responsibility towards the salmon; they may do just whatever they like with regard to the salmon, and kill them or not, as they like.

2900. In that question I am assuming that the mill industry is more important than the salmon industry, but, as a matter of fact, is that so in your experience?—It certainly is not so in Galway. I cannot say what it may be in Ireland generally. There is no doubt the salmon fishery in Galway is very much more important than any one, two, or three of the mills.

2901. Can you give the Committee any idea of the relative amount of capital invested in the salmon fishery as compared with the amount invested in the mills?—I could not.

2902. I think you are prepared to state confidently that as far as the Galway fishery is concerned it does represent as much, if not more, capital than the mill industry in that district?—I

Mr. Seton-Karr—continued.

do not know whether it does not represent as much as all the mills put together, but I could not say that absolutely. There is no doubt it represents a great deal more than many of the mills there. I do not think it is at all relevant whether it is more or less.

2903. I will ask you this: as a matter of fact, your position, as I understand it, is that whether the salmon fishing industry is less or greater than the mill industry, it is totally outside the question to consider that?—Yes.

2904. The principle is that the millowners are bound to protect the salmon fisheries, is it not?—That is my position.

2905. Because of the injuries inflicted by the existence of the mills which they put up?—I should suggest it to the Committee in this manner; that all these mills are so many artificial erections, the sluices, the gates, the channels, and so forth, are so many artificial erections superadded to the salmon rivers, and I should hold that, as a matter of equity, they were erected subject to the interests of the salmon rivers. They are not erected to destroy the salmon rivers. They are erected to get water from the rivers, and are erected subject to the salmon interests.

2906. In other words, you say they have no right to produce their wealth at the cost of destroying the wealth of others?—I should think not. I should think the contrary to be not a theory of production at all; it seems to me to be a theory of plunder to suppose that one industry may produce, or make its wealth, at the cost of another industry.

Mr. T. W. Russell.

2907. Assuming that to be your position, the power given to grant exemptions must substitute against that abstract theory, I am taking the abstract position you have laid down without traversing it at all, and I ask you, in view of that abstract position, what do you say to the power the law has already granted to inspectors of fisheries to give exemptions from this law?—We were talking about the abstract equity of the case, but in the exemption clause we come to a position where mills are actually existing, and of course we must take the case where mills actually exist on its actual conditions; as a matter of absolute equity (and I think I might strengthen the position by reference to a great number of cases), it seems to me that no mill ought to be allowed to put up any kind of machinery that would in any manner damage the salmon.

2908. Quite so, but I am not traversing the principle you laid down with regard to the abstract right?—That clause, you see, has reference to facts already existing. The mills are there and salmon rivers are there, and the mills have had a certain period of existence. This was supposed to be the best compromise that could be made with regard to them (just in fact) as with the fish passes. In every new mill fish passes are absolute on the miller, but not in old ones.

2909. Do you look upon the exemption as a compromise; is that your answer?—Yes, I look upon the exemption as a compromise.

Mr. Seton-Karr.

2910. It is a happy compromise in order to assist the mills and the salmon to exist together, is it?—Quite so.

2911. In

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2911. In your opinion do you think that salmon and mills are incompatible or not?—I think not, I should be sorry to believe it, I do not think they are at all incompatible. I think they might go on side by side.

2912. As far as your knowledge goes you think it is perfectly competent for mills to go on running, and also to provide adequate protection for the salmon, do you?—I think so.

2913. As a matter of fact, in your opinion would it inflict serious injury on the investment of capital, if mills were allowed to be erected free from the responsibility of protecting the interest of others such as salmon fisheries?—I think so. I would say in the English Act of 1873 there is a certain clause by which, if a mill-dam is incompatible with the interest of the salmon, there is power to buy the mill-dam up. If there be absolute incompatibility between the salmon and the mill, and the mill is so much more valuable than the salmon, it would be for the millowner to buy the salmon interest up. I mean if it becomes a question of conflict of private interests, and the two things be absolutely incompatible, the equitable course would be for the millowner to buy up the salmon interest, just as in the Act of 1873 the fishery owner can buy up the mill interest.

2914. Is it in your opinion fair to describe the Irish salmon fishery as an important source of national wealth?—There is no doubt about it.

2915. In your opinion, if this Bill is passed, and these clauses are repealed, does this great national source of wealth run great danger of being exterminated?—I think it is distinctly in jeopardy. If the millowners are to get this power of injuring salmon with impunity.

2916. And under this Bill the millowners can as a matter of fact introduce any form of new machinery without protecting it, cannot they?—Yes, without any responsibility with regard to its action.

2917. And according to the wording of it, all the cost of protecting any new machinery they choose to put in will be thrown on the conservators and on the fishery owners, will it not?—Yes.

2918. And they would also have the almost impossible task of watching the mill-races, and preventing poaching at their own expense, would they not?—Yes.

2919. Under this Bill would they be able, even supposing they had the funds, to make entry on the land and so on?—No; there are a great number of objections of that kind which I do not go into, because I go against the principle of the thing. There are a great number of detail objections, but my position is to traverse the principle of putting the cost of protecting the salmon against the damage done by mills on the salmon owners.

2920. In your opinion is it an absolutely unworkable Bill?—I think so, as a matter of detail.

2921. Apart from being wrong in principle do you think it is an unworkable Bill?—It is an unworkable Bill for the reasons I have already given. I may say with regard to the English Act, Mr. Willis Bund, who is one of the authorities on fisheries, says it is inoperative. I do not know whether he is to be called or not.

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not. I know something about the working of the English Act, but in his work he speaks of it as inoperative.

2922. Do you refer to that on the ground that it would never do for Irish legislation to follow the example of English legislation in any way?—It is against the whole line of progress, as I think I shall be able to show you. This is what Mr. Willis Bund says: "These unions, coupled with the words that a grating is not to interfere with the effective working of any mill, will render the power in many cases inoperative." Then there are no funds to work the Bill; that is another point.

2923. The Irish legislation has always preceded English legislation, I believe?—Yes, in the modern period, that is so; the Irish legislation has preceded the English.

2924. And is it practically a long way in advance of the English legislation?—A very long way in advance. Acts that were in force in Ireland from 1842 were not put into force in England till 1861 and later; there is about 14 years difference between them. I have the Report on which the English Act of 1861 was grounded; it is the evidence and the Report of the Commissioners of 1860-61 appointed to inquire into salmon fisheries in England and Wales. Their recommendations are really largely grounded on the Irish Acts that had been passed from 1842 to 1850; this is what they say: "Recommendations. It is satisfactory to observe that in regard to the principal recommendations which it will be our duty to make we have experience to appeal to. Several of the measures that we are about to propose have been adopted by the Legislature, and with very successful results. In Ireland by the operation of a series of Acts commencing with the 5 and 6 Victoria, Chapter 106, the salmon fisheries have exhibited a gradual and steady improvement. In Scotland legislation based upon similar principles has taken place in regard to some of the principal rivers; and though these measures have been too recent to exhibit as yet any striking effect, we believe that the results hitherto experienced are encouraging. Lastly, we may appeal, as an authority of much weight, to the Report made by the Select Committee of the House of Lords in the last Session of Parliament upon the salmon fisheries of Scotland, which embodies conclusions as to the remedies required very nearly similar to those which we have adopted upon independent grounds from the evidence laid before us. The result of the Irish experiment is particularly encouraging, although it must be admitted that the Acts are in many points defective, and do not carry out sound principles as far as might be desired." Then there is a point after point here in illustration. It can be shown that measures that had been in action in Ireland for many years past were recommended for introduction into the English Act, and many, though not all, were actually introduced. For example, there were recommendations as regards central control, local boards, funds, close seasons, mill and navigation weirs, &c., all grounded on Irish experience.

2925. What have you to say on this point with regard to the fish-grating clauses?—The grating clause

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clause of the Irish Consolidation Act of 1842 was introduced with an addition into the English Consolidation Act of 1861. This and the present existing differences as regards the law of gratings are only part of the general principle of difference between Irish and English salmon legislation. The following are further points in illustration: in 1848 conservators with uniform districts were instituted in Ireland; they were not instituted in England until 1865. They were made elective in Ireland in 1848, and not in England till 1873. Licenses were granted in 1848 in Ireland, and not in England till 1855. Then there was a rating clause which I would like to draw attention to, by which several fisheries pay 10 per cent. of the rateable value for the purposes of protection in Ireland. That has never been introduced into England at all.

Chairman.

2926. Who do you pay the 10 per cent. to?—To the Board of Conservators; what the Board of Conservators chiefly exists on is the 10 per cent. on the several fisheries.

Mr. Macartney.

2927. On what?—On the rateable value.

2928. Of what?—Of the several fisheries; suppose your rateable value is 1,000 £ a year, then you have to pay 100 £.

2929. How do you get at the rateable value?—The rateable value for poor-law purposes.

2930. Can you give, for instance, the rateable value of the fishery at Galway?—That is rated at something over 1,000 £ a year, and we pay 10 per cent. per annum, but that includes also the licenses. There is no law of that kind in England.

Mr. Seton-Karr.

2931. In that respect the English law is a long way behind the Irish, is it?—A long way. I will give you other illustrations. Power for bye-laws was given to the Commissioners in 1842 in Ireland. There was no such power in England till 1873. Now with regard to close time; the close time in Ireland is 168 days, the close time in England is 154 days; that shows the difference between the two. It is much more stringent as regards Ireland than England. That is the annual close time. Now taking the weekly close time; in Ireland, there was a weekly close time in 1842 of 36 hours; in 1861 it was introduced into the English Act and made 42 hours, and that was wholly new to England and English legislation. The 36 hours of 1842 was increased to 48 hours in 1863 in Ireland, but in England it is 42 hours still, with power to increase it to 48.

Mr. Tomlinson.

2932. Who has the power to increase it?—I believe the conservators have the power.

Mr. Macartney.

2933. It might differ, might it not?—Yes, from 42 to 48 hours.

2934. You cannot very well found an argument upon the difference in general close time in England and Ireland when it may differ, can you?—The weekly close time is not alterable in Ireland, nor is the annual close time as regards the

Mr. Macartney—continued.

amount, though it may be altered in application. It must be 168 days; it may end in one place in January and in another it may end in February, but the amount is the same throughout Ireland, and it is more in Ireland than it is in England.

2935. That would be naturally done upon expert evidence that it would be necessary in England. The character of a fish river may differ in England, may it not?—Then I am showing you grounds, on which the legislation is different, and of course the same sort of thing would apply to gratings.

Mr. T. W. Russell.

2936. I should look to the difference in legislation as regards gratings as very much more important than these things: is there any difference as regards gratings?—Yes, I have the differences with regard to the gratings here. I am attempting to show the Committee now how the history of salmon legislation in England and Ireland has been different, and how the Irish legislation has preceded the English.

Mr. Seton-Karr.

2937. I wish to ask you a question about the grating clauses; you referred to Mr. Willis Bund, who is an authority; I think he says that the grating clauses of the English law at the present time are inoperative?—Yes. Inoperative.

Mr. Macartney.

2938. "In many instances," I think you said?—Yes.

Mr. Seton-Karr.

2939. Generally speaking, I think he has described the English law on this point as inoperative; I think your point is that under Mr. Macartney's Bill the grating legislation, supposing it was enacted, would be inferior even to the English law?—It would be; it is not the same as the English law, and very different from the Scotch, for example.

2940. Therefore up to this point the Irish legislation has been ahead of the English legislation a long way, but now by this Bill which is proposed to be passed, legislation will not only be thrown back but made inferior to the English law, will it not?—Yes. Something was said about difference of legislation on gratings. Now, water companies had to set them up in Ireland in 1842; but the water companies had not to set them up in England till 1881. We may hope, perhaps in due time, that the Irish law of gratings as regards mills will apply to the English millowners.

2941. Did you hear Mr. Carce's evidence, or did you read it?—I believe I did.

2942. Do you remember his statement that the difference between the grating law in England and Ireland amounts to a preferential duty on Irish manufacture as compared with English?—Yes; I heard that.

2943. Do you agree with that argument, or not?—No, I think it is wholly fallacious.

2944. Will you tell us on what grounds shortly?—The natural circumstances are altogether different; I think I can give an illustration. We may take the case of a railway train; if you run it through a desert that would involve one

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one set of requirements; if you run it through London that would involve another set of requirements. In truth, the grating law in England is adapted to a set of rivers in which there are very few fish. The grating law in Ireland is adapted to some of the most perfect salmon rivers in the world. I suppose there are no more perfect salmon rivers than in Ireland.

Mr. Macartney.

2945. Are you including the rivers of Wales?—I am speaking generally.

Mr. Tomlinson.

2946. Do you know the salmon rivers of the north of England?—Might I just quote this from Mr. Ashworth's evidence given in the Inquiry of 1860-1, at a time when there was a great attempt made to revive the English salmon rivers. He says: "I conceive, if similar laws and appliances could be brought into operation in England that are now in use in Ireland, our rivers would become equally productive." He was an owner of salmon rivers in England as well as in Ireland. He was well known not only in England but on the Continent; he has the credit of making the Galway Fishery by making passes and opening up new breeding grounds, and he was called and gave evidence in 1880; this was for the purpose of reviving the English fisheries which had gone down to zero almost. He says: "I conceive, if similar laws and appliances could be brought into operation in England that are now in use in Ireland our rivers would become equally productive. The Irish Fisheries Commissioners in their Report of 1857, state that the value of the salmon caught in Ireland is 300,000 l. and more annually, whereas in England I have never seen any calculations that made the annual produce amount to 10,000 l. in value." I am not responsible for these figures, but they were not controverted at the time. This occurs in his evidence. "We have in England and Wales about one-fourth part more rivers in extent than there is in Ireland; consequently it is reasonable to assume that the English rivers may become equally productive with similar laws and appliances. I may state that in our own fishery in Ireland I have had salmon ladders made over all the mill weirs, and I have had natural obstructions, rocks and waterfalls, made accessible to the salmon, over which they had never before been able to pass; and thus with protection to the fish the quantity has increased at least nine times the number that existed seven years previously." Those recommendations were introduced into the recommendations of the Commissioners, and the evidence was given to show how the salmon rivers of England might be again built up, and they have been largely built up since that time.

Mr. Sten-Karr.

2947. Your evidence on that point is that statistics and authorities show conclusively that the Irish salmon industry is far superior to the English?—There is not a doubt about it. You have only to look at the fish that come to the London market to see it.

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Chairman.

* 2948. What has been the cause of the decline of the English fisheries?—The causes are set forth here. I can give you cause after cause; one of the great causes was obstruction by these dams; there was no pass over the dams. These dams were built all across the rivers; the fish could not go up and breed but were obstructed; there was no free migration for them.

Mr. Sten-Karr.

2949. I suppose the natural facilities for salmon breeding in the Irish rivers are greater than in the English and Scotch rivers?—I would not speak of the Scotch rivers, but am inclined personally to think they are better adapted than the English. I think that the lakes and the waterfalls of Irish rivers are more the home of the salmon than the English rivers; that is a private opinion.

2950. Another reason would be, would it not, that the invested capital in England and Scotland being larger in mills and mill industry, therefore the rivers there have suffered more by reason of larger and more numerous mills?—Possibly. There is no doubt the rivers in England were dammed up very much indeed at the time of the 1860-1 Inquiry, and much of the succeeding legislation was for the purpose of getting passes over these dams or opening up fish passes.

2951. I asked you a question with regard to the difference in position of the Irish manufacturer and English manufacturer on a point of evidence given by Mr. Caroe. You deny, do you not, according to what you just said, that the Irish manufacturer is in any way in a worse position than the English manufacturer with regard to the preferential duty?—I do. As regards Mr. Caroe's particular argument I would observe that he actually bought his mill subject to the duty and obligations of protecting the salmon from damage. As far as he was personally concerned, the grating law could have no sort of preferential effect on him; its repeal would give him a greater profit really at the expense of the salmon owner.

2952. That is quite a sufficient answer to his argument you think, but even apart from that, do you think the Irish manufacturer is in any way in a worse position than a Scotch manufacturer say, with regard to the law as to grating clauses?—Of course he has his set of duties with regard to the natural circumstances. He is in one set of natural circumstances; the other may be in a different set, but it cannot be spoken of as a preferential duty in any sense.

2953. You do not admit that, do you?—No, not at all. It is the fallacy of confusing natural differences with artificial restrictions.

2954. You think if there is any inequality the proper course would be to extend the Irish law to England, do you not?—I should think so; that would be the course of history; the Irish law has been extended usually to England. I see that in the evidence of Mr. Caroe there is this question and answer: "I think you are aware there exists under the law in Ireland restrictions with regard to the use of water in connection with turbines generally, which do not exist in England or in Scotland?"—(A.) Yes, and against that I protest. It would be what I would call in railway language a preferential rate against a competing

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competing industry, and that would be most unfair to us, and it would destroy our power of competing if our water power was interfered with." I can give a great number of examples of such preferential duty. There was an Irish law preventing people feeding pigs on fish fry and ova on the strand of Irish rivers. I do not know whether there is such a law existing in England, but if not I suppose that law would be a preferential duty against Irish agriculture.

2955. As we have the language of that answer, do you say in the first place that the Irish manufacturer works his mill with his eyes open, and subject to all the responsibilities affecting the fish?—Subject to all the responsibilities.

2956. And in the next place you do not admit that he is in a disadvantageous position as compared with the Scotch manufacturer; as a matter of fact, do you?—Certainly not.

2957. Is it a fact that if the Legislature tries to assimilate the Irish law of gratings to the English law, it will try to assimilate practically the Irish salmon rivers to the English salmon rivers, which means, if I understand you right, trying to assimilate a much more important and larger class of industry to what is really a much lower class?—A much lower class; I think it would be reducing the salmon interests in Ireland to a lower level of production and wealth, and would be against the whole history of legislation.

2958. And the whole history of legislation on this point shows, does it not, that the Irish salmon legislation has always been ahead of the English salmon legislation, and that to turn round and ask the Irish law to be assimilated to the English law is putting the cart before the horse; and reversing the whole principle?—It would be a distinctly retrogressive step.

2959. Would it be reversing the whole principle of legislation?—I think so. All the principles of salmon culture have been worked out in Ireland. We have a wonderful area there for working them out, and they have been worked out and extended to England just as other things have been worked out in England and extended to Ireland. I apprehend that is one of the matters in which Ireland may be distinctly said to be superior to England.

2960. I want to ask you a question as to the obligation of millowners to protect the salmon fisheries which their mills injure. I think you quoted, as a sort of precedent for that principle, the obligation of railway companies running through an estate to keep up fences to keep out sheep and cattle?—Yes, it seems to me to be a fair instance. If you make a railway through an estate, the railway company have no right to tell the farmer he must protect his own cattle, and prevent them coming on the line; the railway company is bound to put up fences.

2961. Another case in point would be where town water committees or companies have to keep up gratings for the preservation of salmon at the expense of the rates, would it not?—Yes, they have to do that already. If a town committee or a water company gets water from a river, it is bound, at its own expense, or rather at the expense of the public out of the general rate if it is a town supply, such as in Birmingham, to put up a grating to prevent the salmon

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from going into the water and being carried away.

2962. That is clearly established, is it not?—That is established in the 1842 Act in Ireland, and the 1861 Act in England.

2963. Another case in point would be the obligation of mills not to pollute rivers, which is also established by law, would it not?—Yes, that has been long established in law. They may say, "Well, we get no advantage from keeping the water clear," but the law says, "You have no right to throw your filth into the river and damage other people and the fish."

2964. Then it amounts to this, that in asking the millowners to protect the salmon and fry against the machinery of their mills, you are simply following the precedents which have already been laid down in these three cases you have cited?—Undoubtedly.

2965. That is the clear legal position of the matter in your opinion, is it?—I think so. I might refer to one clause in the 1842 Act which seems almost potentially to contain all the provisions as to gratings, in which all injury to fry is strictly forbidden, or any interference with them; in general terms it is forbidden.

Mr. Tomlinson.

2966. Is that the English Act?—No, the Irish Act. It says: "Be it enacted that if any person shall wilfully take" and so on, "or by any device wilfully obstruct the passage of the said fry or injure or obstruct any such spawn or fry." That is Section 73 of the Act of 1842.

Mr. Seton-Karr.

2967. Your point is that the legal responsibility which you ask for on millowners to pay for the protection is only according to legal precedent?—Undoubtedly, it is according to all legal precedent. It is the great principle of jurisprudence that you shall use your property so that you shall not injure the property of another.

2968. As a matter of convenience, do you think there would be the slightest difficulty in so adjusting the protection as not to interfere with the effective working of these mills?—I think not.

2969. You are not suggesting that the two industries are incompatible, and cannot live side by side, are you?—Not at all.

Chairman.

2970. As a fishery owner, do you think a grating or lattice could be erected sufficient for your purposes without obstructing the waterway?—I am sure it can. I do not think a thing of that kind which has been produced would be necessary. It appears to me to be altogether unnecessary. The river, too, must be in a filthy condition, I should say, to fill it up in that way.

Mr. Tomlinson.

2971. With reference to these analogies you have been giving, you say you think that a millowner is in an analogous position to that of a railway company. It is a fact that a railway company exists by virtue of an Act of Parliament, and

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and under the powers conferred by an Act of Parliament, is it not?—Yes.

2972. And the railway company obtains powers, and obtains land compulsorily for the purpose of carrying out its line?—Yes.

2973. And on the conditions which Parliament prescribes?—Yes.

2974. Then as to the water companies, they would be in the same position, would they not?—Yes.

2975. They can only exercise the powers Parliament has conferred upon them, can they not?—Quite so.

2976. And subject to conditions which Parliament prescribes?—Yes, everything is of course subject to Parliament.

2977. But a millowner is in rather a different position is he not? A millowner is *prima facie* only exercising his common law rights on his own land, is he not; he is not exercising any special powers?—A millowner of course, if you come to a matter of law, is already bound by these very Acts that we are speaking of.

2978. That is another matter?—But that is not a case of common law. I was speaking from the general principle of jurisprudence. I thought I was asked as a question of equity how one would formulate the duties of a millowner.

2979. All I want you to say is that these analogies rest on different footings altogether. The railway company and water works companies obtain their powers subject to conditions prescribed by Parliament, and the millowner is exercising his common law right, is not that so?—Yes; but I would suggest that the underlying principles of law in these cases are similar.

2980. Had there been a decrease in salmon in the Galway river, in your experience lately?—No, not lately; it is a variable thing; Mr. Ashworth showed how enormously it had increased. I do not think it has gone on increasing in the way he gives in his evidence; it varies.

2981. I suppose it is possible to have too many salmon in a river?—I do not think so; you mean breeding salmon?

2982. Yes?—I do not think so. I have heard the doctrine stated that you may have too many breeding, but I believe in sending up as many fish as you can.

2983. Have you never heard of a salmon disease in a river?—Yes; but we have never had it in Galway, and I question whether it arises from too many fish; I suspect it arises from pollution.

2984. Is it not a fact that some skilled persons think it does arise through having too many fish in the river?—I could not say.

2985. I want to ask you a question about salmon ladders. Have not salmon ladders been extensively put up in Irish rivers?—Yes, I may almost say it is the home of salmon ladders.

2986. You have heard the evidence given by the other witnesses with reference to salmon ladders, have you?—Not all, I think. I can give you case after case of salmon ladders; Mr. Ashworth has put up several salmon ladders himself.

2987. Several of the gentlemen who have been examined have complained of the inefficiency of O.S.O.

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the present Acts with regard to the erection of salmon ladders or fish passes?—May I ask in what way?

2988. The rivers we have had evidence about are the tributaries of the Bann?—As to any mill erected since 1842 the millowner is bound to put up a salmon ladder.

2989. I cannot refer to the exact question, but there was one gentleman who had complained of the injury done to the fish by raising the weirs?—That is a very common thing.

2990. And I asked him whether they could not require anyone to put up salmon ladders, and he said, though the Acts contained provisions there were no penalties attached, and that there was no power to compel it. Have you had any experience of that kind?—No.

2991. And your experience is that a great deal has been done in the way of putting up salmon passes, is it?—Undoubtedly in Galway; and the place has been largely improved by it and by clearing away obstructions and making salmon passes of various kinds to help the free migration. That is the great principle Mr. Ashworth always kept in view, namely, to do away with all sorts of obstruction to the migration of the salmon from the sea to the breeding rivers.

2992. Is it your experience that salmon, if there was a clear water way up the main stream of a river with a fish pass would still prefer a mill race to a fish pass?—It depends on the strength of a current; if you have a powerful current coming down the river they will not go near the mill race. Usually in summer at the height of the run the water is low coming down the river, but it is much stronger coming down the mill race, and then they go up the mill race. I believe I should be very much within the mark if I were to say that the number of fish that went up the mill race last year when the grating was broken down amounted to 1,000. They were collected all round the grating. There is a powerful current coming out through the grating, and they collect round there. You break the grating, and up they go.

2993. How long would they stay opposite the grating?—It is difficult to say. You will always find fish there; whether they are always the same fish one could not say, but they collect there.

2994. And for all you know a grating may not be effective to prevent them waiting about the millstream?—You see when they are outside the grating they really are in the river; they are not in the middle of the river but by the side of the river, whereas if the grating is broken down they are up some 200 or 300 yards in a narrow gut.

2995. Do I understand you to suggest that you would leave it to the millowners to specify the kind of grating they would put up?—I do not think any fish owner would object to the sort of grating so long as it would keep out the fish; that is all we want.

2996. Do you really think the conservators ought to prescribe the kind of grating that ought to be put up, or would you leave it to the mill owners to put up what you consider is effective?

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—I think there ought to be some means of determining whether a grating is effective.

2997. In whom would you vest that authority?—At the present moment it is in the inspector of fisheries, and I should not have the slightest objection personally if there were a doubt about matters to an appeal from inspectors just as you have in a great number of other cases in the Fishery Laws.

2998. Have you formed any opinion as to the proper form of grating?—Are you speaking with regard to fry?

2999. Yes, take fry?—With regard to fry I have not; I do not know so much on that question; it is a question that has never come to me at Galway. We never considered it was worth while to protect the fry against basket wheels. But with regard to the other gratings I could tell you a great deal more about them.

3000. At what period of the year do you think it would be necessary to have a grating that would keep out fry?—I believe that would differ in different rivers, but in Galway the fry go down from the middle of April to the 8th June. That is merely an average; May is practically the month. They are going down now at the present moment; and it is only for that time that you want a grating for fry, it is not all the year round. Every river varies.

3001. Are salmon caught with nets in the estuary of the River Galway?—No. The word estuary is a difficult word to define. We do not catch them in the estuary; there is a right of fishing a certain distance outside.

3002. Is your fishing fly fishing?—No, ours is a several fishery. We have a fishery from Lough Corrib to the sea.

3003. And do you net the whole of the river?—No, we have a right to net the whole river, but as a matter of fact we net the tideway.

3004. I suppose the Galway river is not much polluted, is it?—No, not yet I am glad to say.

3005. You have gone extensively into the evidence as to the diminution of salmon in English rivers; is it not the fact, as appears from evidence, that a great part of the diminution is caused by the extreme pollution of English rivers?—There is a difference of opinion among authorities. Some say pollution, but others the dams. I believe the better authorities say it is more the dams. You see if you have a dam across a river it is impossible for the fish to go up to breed, and unless the fish goes up to breed the whole river is in course of extermination. They will stand a certain amount of pollution.

3006. Is it not within your knowledge that fish passes have been erected in most of the English rivers?—I believe they are being erected, but they are not universal as far as I know, and I suspect you would have to re-stock the English rivers before you could revive them. We had to re-stock the Galway river; that was the first thing that was done. We carried fry quite up into the branches of the river; there they grew and came down again, and by degrees the fishery was built up, and I suspect you would have to do the same in England.

3007. What rivers in England do you think would require re-stocking?—That is a difficult matter. We have talked a good deal about our

Mr. Tomlinson—continued.

rivers in Wiltshire, Gloucestershire, and Somersetshire, but it is a very difficult thing to do.

3008. You would not apply that to the Severn for instance, would you?—No. The Severn is somewhat damaged in some of its Welsh branches by pollution, but no doubt the fish do go up in the Severn.

Mr. T. W. Russell.

3009. Have you any idea as to the value and extent of the fishing industry in Ireland?—Mr. Ashworth in his evidence, quoting the Irish Fisheries Commissioners in 1837, says 300,000 £. I believe now they speak of 600,000 £, but I do not think my evidence is worth taking on that matter.

3010. Have you no idea as to the number of people employed in the industry?—I have not.

3011. Did you hear the evidence of the mill owners from Antrim, or have you read it?—Yes, I have looked through all the evidence as well as I could.

3012. Did you read, for example, Mr. Webb's evidence and the evidence of several other mill owners from Antrim, which stated that if the law was carried out their works must stop?—Yes, I heard that.

3013. Did you read the evidence given by the same gentlemen traversing the idea that turbines were injurious to salmon fry?—Yes; and my reply to that is if that evidence is good for anything the clause does not apply.

3014. Do you agree with the witnesses that from your own practical experience these turbine wheels are not injurious to fish?—My experience is not worth having on that subject; I do not know anything about the turbine so it is useless to speak, I can only say what I hear, and that is more hearsay; I can show you evidence which I have here, which affirms the destructive action of the turbine on fry.

3015. Do you know anything about the effect of the bucket wheel on fry?—We do not think the bucket wheel has any effect on fry. We do not object to the bucket wheel as regards fry, but we do object to the bucket wheel on slots and on up-going fish.

3016. Is that from evidence as to its destructive nature?—Yes; that case I gave you of Buckland's was the case of a bucket wheel. He produced a model of the salmon to the Committee.

3017. I want to ask you a question about the exemptions given by the fishery inspectors, there must have been some evidence before the Legislature that an inquiry was possible to mill owners before Parliament enacted that these exemption orders should apply, must there not?—I should think it must have been stated in some way.

3018. You see the difficulty the Committee find themselves in here is this, there are two rival industries, the salmon fishing industry and the milling industry throughout Ireland. Parliament has recognised at all events that inquiry may be done to the mill owners by enacting that an exemption order should be granted?—Yes.

3019. Now supposing these exemption orders to become universal what would be the result of the salmon fishing industry, supposing the legislation which Parliament has already enacted

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were to be universal or were to be anything like universal?—The exemption do you mean?

3020. Yes?—That is to say if you do away with the clause altogether?

3021. By the practical working of the Act itself, assuming that the exemption orders were to become universal, and that the inspectors of fisheries were convinced that the mill owners ought to have that protection, what would be your remedy then?—It seems to me that that is a matter of fact. I cannot realise the idea of an exemption order becoming universal.

3022. It has become almost universal in Antrim; either exemption orders have been granted, or the law has been disregarded. You see the real difficulty is that we are face to face with these rival industries, and we shall have to take the law as it stands, and Parliament has already decreed that the inspectors of fisheries shall have power to grant exemption orders?—Yes.

3023. These orders have been extensively granted in Antrim, and where they have not been granted the law has been set aside; now what has been the result of that?—You see if the exemption order is granted, it seems the millowner gets what he wants; but then is that a reason for doing away with the law altogether, or doing away with the clause in places like Galway and southern streams which are not in quite such an unclean condition, and where there are no exemption orders granted, and where there is no reason for them: I challenge anyone to prove that our gratings in Galway interfere with the effective working of a mill. The gratings have been going on there for years.

3024. Are the gratings universal in Galway?—To every mill?

3025. Yes?—No, not to everyone, but to the chief ones they are.

3026. You would not make any comparison between Galway and Antrim, for example, would you?—No, and I would not like this exemption, because it may apply to certain mills in Antrim, to be made to apply to Galway. I mean, if an exemption is necessary in a particular case, one rather objects that that should be generalised into a repeal of the law. If an exemption is necessary for the effective working of the mill, I do not object to it, there is the Act. But when the exemption is not necessary for the effective working of the mill, I say the duty rests with the millowner.

Mr. Tynan.

3027. Is there a lattice, or anything of the kind to keep fry from getting into the turbine on the Galway River?—I really do not know. This thing has only been up about a month or two and I do not know.

3028. But it has been up, has it not, during the time when protection is required?—Yes, it is up at the present moment, and I suspect there has been something put up, either a lattice or a small net or something. I am sure our lessees there would be looking after that sort of thing.

Mr. Seton-Karr.

3029. You attach much more importance, I think, to the gratings at head races and tail races.

Mr. Seton-Karr—continued.

races, do you not?—Personally, I do, but I do not mean to say they are more important.

3030. I am speaking of Galway in particular?—Yes, because we never had the turbine, but I dare say we shall attach just as much importance to the turbine clause now we have the turbine there.

3031. But the great injury to fish there has occurred from their getting up the mill races and being poached and killed in the bucket wheels, has it not?—Yes, and the slats going down.

Mr. Hoar.

3032. Do the salmon in Ireland belong to the riparian owners?—It depends; if you have a several fishery, it belongs to the owner of the several fishery.

3033. By charter?—By charter. Our charter goes back to the reign of John.

3034. The riparian owners have no rights whatever over the salmon, have they?—Not in the several fishery, but the riparian owners have rights.

3035. For fly fishing?—Yes.

3036. Does your charter not take precedence over any riparian rights?—No, our charter is defined from Lough Corrib to the sea, but on Lough Corrib, and all these streams that go into Lough Corrib, the riparian owners have rights of fishing.

3037. In saying that the law in Ireland is ahead of the law in Scotland and England, do you mean that it is more advantageous to the salmon fishery, and more disadvantageous to the mill owner?—Do you mean as to the duties?

3038. You said that the law is ahead in Ireland?—Yes, as being more protective to the salmon.

3039. As against the mill-owners?—As against the mill-owners, and also as regards the enforcement of duties on the salmon owners themselves.

Mr. Macartney.

3040. I want to call your attention to my Bill; have you a copy of it before you?—Yes.

3041. The Bill is practically divided into two parts; the first three sections apply to previous Irish legislation, you see?—Yes.

3042. And then there are three further operative sections which are drawn from the English Act?—Not entirely.

3043. You see in line 15, clause 4, the words "watercourse, millrace, cut, sluice or other channel." With the exceptions of these words, which are the words used in all Irish legislation to describe these particular things in connection with millowners and salmon fisheries, is there anything else in which section 4 differs from the section from which it is copied in the English Act?—Yes.

3044. Where?—It may not be very obvious to the Committee unless they had studied both the English and the Irish Acts on which this proposed Bill is built. This clause is built on the Irish Act of 1842.

3045. Would you agree with me in drafting a Bill applying to Irish fisheries that it would be advisable to use words describing the watercourses, millraces, cuts, sluices and other channels in words used in previous Irish legislation, and

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not introduce other words to describe the same things?—Quite so.

3046. Now, I want you to point out to me the other words in that clause which differ?—You see this clause is founded on the Irish Act of 1842. The corresponding clause in the English Act is founded on the English Act of 1861, and the clause of the Act of 1861, though borrowed from the Irish Act, is different from it. There is something added; for example there is an obligation to fence in navigable canals in the English Act which does not apply here at all.

3047. We are not touching canals?—You are asking about the differences; and I say that is one point.

3048. That does not really affect the question at issue in this legislation, does it?—But I am simply showing you how the thing differs. You see, as oftentimes occurs, if you compare Irish with English legislation, the English legislation comes about 30 years after the Irish legislation; but improves on it. Now if you read the English clause of 1861, it is in advance on the Irish clause of 1842; that is where the point comes in; so I say there is this omission. But there are other things to come afterwards.

3049. I should like you to point out where it differs from the clause in the English Act, and I want you to point out the words?—It differs in effect; when I point it out you say it does not matter.

3050. Then do I understand you, as a fishery owner, that you would not object to Clause 4, if it included something about canals?—I should; I object to the thing in *seco*; I object to the repeal.

3051. But this does not repeal anything; I want to draw your attention to the fact of new legislation. You told the Committee that this clause was not the same as the clause in the English Act, and I want you to point out to the Committee now what are the words in this clause which differ, with the exception of the words of description, for which I have adopted the Irish phraseology, with the section in the English Act?—I thought this clause as a whole was a substitution for the repealed clauses.

3052. We will go through the Bill. Do you object to Clause 3?—Yes.

3053. Now come to Clause 4. I only want, as a matter of fact, your admission; do you, or do you not, say that it is a precise copy of the English clause?—I said the effect was different; but if you do away with Clause 3, I do not object to Clause 4 in the slightest degree.

3054. And is your other point that Clause 4 differs in effect, and one of the effects is, because in the clause in the English Act upon which this Clause 4 is founded, there is something about fencing in navigable canals. Now I put to you, if I introduced that into this Bill, would you agree to Clause 4?—You ask me whether the effect of this clause is the same as the English clause, and I say no, and give that as an illustration; but we were speaking of the clauses generally, and I have some more important things to point out.

3055. I want to know if that is the substance of your objection to Clause 4?—No; my objection to Clause 4 is that it is put as a substitute

Mr. Macartney—continued.

for clauses which are repealed. I have not looked at it carefully to see whether the clause as a clause repeals the compulsory grating clauses of the Irish Acts; it may be that it does, but I have not looked at it in that light; I do not think it does.

Mr. T. W. Russell.

3056. Do you not see in the second and third lines of Clause 4 that the principle is enunciated which you have most determinedly traversed during the whole of your evidence, namely, that these things are to be put up at the expense of the conservancy board?—Then, if so, I object to it distinctly. But if you have a power of compelling the millowners to do it, that is the point. If you do away with the third clause you have still your power to compel the millowners.

Mr. Seton-Karr.

3057. I take it that you made a mistake when you said that you had no objection whatever to Clause 4?—If it means what has just been alleged I have an objection. It says here: "Any board of conservators after" so and so, "may do" so and so. It does not compel them to do so, and you can compel the millowners to do it. The repealed clauses are compulsory on the millowners; Clause 4 is permissive to the conservators.

Mr. T. W. Russell.

3058. But you are a lawyer, and you know very often it may mean "shall" in law?—But it does not here, I think, and this clause can only be read in relation to the clauses which are repealed.

Chairman.

3059. If you do not repeal the clauses which are proposed to be repealed by Clause 3 then you have no objection to Clause 4, but if you repeal the clauses proposed to be repealed you do object, do you?—Undoubtedly.

Mr. T. W. Russell.

3060. What I want to point out is that it is "may," but if the board of conservators do not put them up there is no provision for their being put up at all?—If the Irish grating clauses are not repealed you have a compulsory power on the miller to put them up.

Mr. Macartney.

3061. In your examination by Mr. Seton-Karr you led the Committee to believe that the clauses in my Bill were not the same as those in the English Act, and I want to clear that up. In the first place I want to ask you whether you are prepared to say if there are any words in those three clauses which are not in the English clauses. They are copied by me verbatim from them?—But others are omitted.

3062. I am not talking about what is omitted. There is a great deal in the English and Scotch Acts which is omitted, but this Bill simply deals with two particular questions which are remitted to this Select Committee to hear evidence upon, and one of them is this question which is contained in Clauses 4, 5, and 6. I want to ask you whether you will not admit that; I may tell you they are copied verbatim?—I know they are, but

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but there are other clauses which are relevant to the subject of gratings in the English Act which are omitted in this one.

3063. Which?—The omission of powers of conservators to determine the time of placing gratings and of the objection of owners and occupiers of adjoining lands to preserve gratings. There is an omission of the method of determining compensation. All those clauses are omitted.

3064. Would you approve of these clauses being added?—No; I should still object, because I object to the English legislation altogether. I say, merely as a matter of fact, there are these three omissions relevant to the subject of gratings which are present in the English Act.

3065. But these things are provided for already in Irish legislation, and therefore they were, in my opinion and judgment (of course I should be glad to add them if they would diminish your hostility) unnecessary?—It would not in the slightest.

3066. That is not the substance of your objection, I take it, at all?—No; my objection is on the point of responsibility.

3067. You alluded to the evidence of Mr. Frank Buckland; I do not know whether you have read a passage in that evidence in which, dealing with a question of millowners' rights, he states his opinion that they ought to be in no way interfered with?—I do not know that.

3068. I cannot give you the reference?—I have all his evidence here, if you would like to refer to it. Have you observed that he says gratings should be put up at the expense of the miller.

3069. Perhaps you will show me that; his advice was not followed in English legislation, was it?—No.

3070. That will be quite sufficient for me; do you say that the millowners are the whole cause of damage to fish in Irish rivers?—Oh, no, not the whole cause.

3071. Then what other causes of damage are there, in your opinion?—There is the general poaching, of course.

3072. Is that a very serious cause of damage?—I think so. It costs us an immense deal for water keepers.

3073. Is there any other cause?—There is the killing of the fry in the country districts.

3074. Is that a very serious cause in the Galway river?—We always think it is rather serious to kill fry. They feed ducks and pigs with them. To prevent them would be a restriction on agriculture, possibly. I do not see why we should interfere with the free action of the farmer's ducks and pigs any more than with the free action of the miller's machinery. It seems to me the principle is exactly the same. Pollution does not affect us.

3375. What proportion of the destruction do you allot to the action of the millowners on the Galway?—I do not know that it is a great deal, because we act in very good accord now. You see, we have the grating there, not to all the mills, but to the chief ones. No doubt there are constant cases of poaching every year, more or less, and more or less the fish get through the gratings, and are detained in the races. That

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sort of thing may occur. Small fish may get through, and may be kept there. I do not mean to say that most of the poaching in Galway is now due to the mills; I should be sorry to make such an allegation.

3076. On the question of poaching, you admit at the present time that the Conservators, or the people who choose to protect their fisheries, can detect and summon poachers even on the mill races, can they not?—No, not without the gratings.

3077. But you have full power; there is nothing to prevent you, is there?—If we can find them.

3078. Surely it is not a very difficult thing to watch 400 or 40 yards of mill race, is it?—I assure you it is very difficult. There are a variety of these 400 yards.

3079. There are only 14 mills, are there not?—You must consider them something like a branch of a tree; the river comes down so, and there is a branch here which subdivides, and so on, and another here which subdivides, and on these subdividing branches you get the various mills.

3080. In the report of the conservancy board of the Galway district for 1891 they say they employ 100 bailiffs?—Yes.

3081. Surely 100 bailiffs would be sufficient, or a portion of them even would be sufficient, to watch 28 head and tail races, would they not?—I should explain, though the conservators have all these bailiffs they are distributed all over the river; some of them are up in Mayo.

3082. But surely if there was a very material injury to your fishing done by the poaching in the head and tail races, and knowing you had only to watch them in order to catch the men there, and that they would be caught on an area not exceeding 400 yards, and sometimes as low as 40; do you not think if the poaching was very very serious you could deal with it effectively?—You will pardon me. You keep saying "only 400 yards." There are several 400 yards, and there are several 40 yards, and, moreover, poaching may occur in blind arches, and in the mills themselves where we have no power of entry unless we have a search warrant.

3083. Do you say the millowners would not assist you?—Many of them are very good. But, at the same time, there are millowners and millowners, and, moreover, there are mill attendants.

3084. Have you ever applied for the assistance of millowners on these rivers to watch these blind arches and been refused, for the purpose of catching poachers?—We have to some extent eliminated the necessity of watching the blind arches by means of these gratings.

3085. Do you say you have had any difficulty in dealing with the millowner when you alleged that poaching was going on?—Undoubtedly we have had difficulty. That very case that I gave where the water bailiff got into the mill after getting into collusion with the mill man is an instance. The latter gave a signal when the mill stopped, and the bailiff went in and found those 20 useless fish. He would have had no right,

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as an ordinary matter, to go there. You cannot go into a man's mill every day.

3086. Had you applied to the millowner?—We knew nothing about it.

3087. But had you made any application?—You might go in 10 times and find no fish, and on the eleventh time they might be there. You are in a dark corner, as it were, and with fish constantly coming down, you would have to keep men there eternally to see that fish were not caught unless you had means of preventing them. Supposing you had a man staying there 12 hours so as to prevent it, in the other 12 hours the fish might be poached.

3088. It seems to me if the destruction going on was enormous it would be worth while for you to take effective measures to protect your rights, and to apply to the millowners to help you. I want to know if you allege that you cannot apply to the millowners?—No, I do not think we could for one moment, from our experience, have any sort of effective power over the poaching without the gratings, but by putting the gratings up we prevent the fish going in.

3089. On the question of gratings, the grating you desire to put up would be simply effective against large fish, would they not?—Yes; about an inch and three quarters or two-inch gratings are the ones we use.

3090. Salmon fry would easily go through those gratings, would not they?—Yes.

3091. Do you suggest it is possible to erect any grating at head or tail races which would be effective against salmon fry, and which would at the same time give a free flow of water to work mills?—I do not like to speak on a matter of that kind not being an engineer, but the matter is very fully discussed in these reports, and various forms of grating suggested. It was said that you could always get any flow of water that you wanted by widening your stream or mill race. Professor Rankine gives that evidence in the 1869 Inquiry.

3092. There has been expert evidence before the Committee, that it would be impossible to erect any grating or lattice either at the head or tail race which would effectually prevent salmon fry going through, and which at the same time would give free water power to a turbine or other wheel to work?—I am not an expert, and I would not like to say. There has been evidence given in a contrary sense by other experts in these inquiries.

3093. But not before this Committee?—No. Moreover, as an actual case, there is the Cork Waterworks where some grating of the kind has been erected.

3094. What is the capital invested in the Galway fishery?—Do you mean what it is worth?

3095. No, I want to know the amount of capital invested in it?—I could not really tell.

3096. You have told the Committee that the capital of the Galway fishery was considerably greater than the capital of the mills?—I did not say then all the mills; I will give you an illustration a well known case. Mr. Ashworth spent a good deal of money in putting up these ladders—

3097. Is the Galway fishery a syndicate, or is

Mr. Macartney—continued.

it owned by private individuals?—It is owned by private individuals, it is a several fishery.

3098. Is it owned by Mr. Ashworth?—It is my wife's.

3099. Is it owned by one individual?—It is owned by one individual.

3100. Was it purchased?—Yes.

3101. What was paid for it?—I could not exactly tell you, but it was purchased a great number of years ago, and has increased in value. I will give you an illustration of the capital invested. Mr. Ashworth spent 2,000 l. in trying to make a pass between Lough Corrib and Lough Mask.

3102. Can you supply the Committee, before the conclusion of the sitting, with a table of what you consider to be the capital invested in that fishery, because this question that you have raised is important?—Yes. Let me say one thing in regard to capital invested. I can show that Mr. Ashworth spent more than the purchase-money of his fishery before he got anything out of it in the way of invested capital.

3103. That would apply, I suppose, to nearly every commercial undertaking, would it not, or to a great many?—No; when you buy a fishery you suppose it is worth something, but he had to spend this money in making the fishery before he got anything out of it.

3104. I will not press this matter with regard to the Galway fishery, but I shall, with regard to the others, if the evidence is given?—I was asked the question as to the relative capital value of fishery and mills, but my position is, that it is absolutely irrelevant to an inquiry into their relative rights and duties.

3105. I will put it to you generally; the fishery is a productive fishery, is it not; do you get a fair return for your capital invested?—Yes, I think it is a valuable property.

3106. With regard to the analogy to railways, I want to ask you this. I acquire by purchase or by lease land over a riparian owner, we will say; I purchase it out and out with all his rights, and I erect a mill on it, and make water-courses, subject, of course, to all the incidence of taking water from the river. Do you allege I am interfering in any way with any portion of your property; do you say the water up there is your property?—I am speaking, of course, as a conservator with regard to the salmon generally.

3107. I am taking you as a fishery owner, not as a conservator. I want to ask you what are the limits of your interests?—Taking your case, if you bought the land and erected your mill in that manner, you would be bound by law to make a fish pass, that is to say, you are bound to do something which is of no advantage to your mill.

3108. A fish pass where?—Over your dam.

3109. But supposing I do not make a dam?—I mean that there is this liability on you by law. If you make your mill you must make a fish pass.

3110. Supposing I have made my dam, and I have made the pass and everything, and ladders, which I admit I have got to make, where do I touch your property?—I do not think you do at all, if you make a fish pass for the fish to go through and otherwise conform to the law.

3111. But

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3111. But do you say you have a property in the fish if they come to the dam?—No; we are speaking now, I apprehend, about the preservation of fish.

3112. I am asking you as a fishery owner; your fishery rights are circumscribed to the area of your charter, are they not?—Yes.

3113. Have you any property in the fish after they leave that area?—No.

3114. You do not claim any property in the fish either before they come into your area or after they leave it; do you?—No.

3115. You have no vested interest outside the area covered by your charter, have you?—No; I do not see how we can say we have a vested interest. We have this sort of interest, any way, a right of access to a great deal in protecting the salmon, and seeing that the salmon laws are enforced all round the branches of the river.

3116. Are you speaking now as a salmon owner or a conservator?—Both.

3117. Naturally conservators have that interest?—As an owner, apart from what we do as conservators; I may say the money we get as conservators is a very small proportion of the amount we spend for protection, and we do protect these breeding streams, it may be, for 50 or 60 miles or more in different directions.

3118. For your own benefit?—For our own benefit.

3119. And it pays you to do that, does it not?—Yes.

3120. You would not do it if it did not pay you, would you?—No.

3121. I want to know if you say you have any vested interest outside the area covered by your charter, which gives you liberty to fish, either in the water or in the fish?—The idea of vested interest is an extremely difficult question.

3122. You used the words. You said the mills were erected subject to the vested interests of salmon fisheries, and I want to know what you mean by that?—I was speaking about the fisheries generally. I say that the mills came after the salmon fisheries, and I was speaking of the mills and the salmon fisheries of the river as a whole.

3123. I want to take your own instance, because cases may probably vary. Take your own salmon fishery, and tell me where your vested interest is on the river, either with regard to fish or water, outside the area covered by your charter?—We have an undoubted vested interest in the maintenance of the law. Our fishery at the tideway is worth so much more if this grating law attaches to mills generally, and if the dam law attaches to mills generally. If there were no power of dealing with dams, and setting up fish ladders and passes, our fishery at the mouth of the river would not be worth nearly as much as it is.

3124. Have you any interest outside the area which is covered by your charter?—We have the greatest interest.

Chairman.

3125. You preserve fish up the stream beyond the limit of your charter, do you?—Yes.

Mr. Macartney.

3126. You do that for your own interest, I suppose?—Yes, because we have this interest.

3127. Have you any interest outside the area covered by your charter upon which you, as a fishery owner, could assert your rights as common law or under statute; have you any interest with regard to the fishing of the water?—We have a great deal of common-law rights, but those are the rights of everybody.

3128. Surely I put my question perfectly distinct to you. You are the owner of a salmon fishery which you own under a charter, are you not?—Yes.

3129. The charter defines the area of that salmon fishery, does it?—Yes.

3130. Within that area you are permitted by your charter to take all the fish that comes, are you not?—Yes; and we cannot catch fish outside.

3131. Have you any other right which you can assert over the fish that come into the Galway river outside the area of that charter?—We have this right of protecting them.

3132. Yes, you do that; that is, you subscribe as a fishery owner?—No; we send our own men to do so; it is not a matter of subscription; we have a certain number of bailiffs; we have power by this Irish Act to appoint those bailiffs.

3133. For the purpose of protecting the fish?—For the purpose of protecting the fish; that is our interest in the matter. We have no power of catching the fish outside our area, but we have the power of protecting fish, and we have the power of removing obstructions; that is where Mr. Ashworth spent a great deal of money in removing the obstructions, so that the fish might pass up to breed. The obstructions were not removed in our fishery at the mouth of the river, but were removed up in the country; where he spent this 2,000 £, for example, it was not near the mouth of the river; it was some 30 or 40 miles away from the mouth of the river, to connect the two lakes, the Corrib and the Lough.

3134. I want to know, apart from those duties and rights which you can exercise in protecting the fish, have you any other right attaching to the fish itself that you can exercise in the river outside the area covered by your charter?—We have no right of catching, but we have every right of preservation.

3135. Preservation which is strictly defined by the legislation?—Yes, strictly defined by the legislation. Amongst others, that of enforcing gratings, and if this right were to be taken away our interests would be taken away. You would attack our interests if you were to succeed in carrying this Bill.

3136. Supposing there were no board of conservators, have you any right as a fishery owner to insist on gratings being erected?—Yes, I believe we have.

3137. Where; can you point out to me any clauses in the Irish Acts where you, as an owner, have a right to insist on a millowner erecting gratings?—I believe it is a statutory right; I do not believe it depends on the conservators to enforce it. I have not read it in that light. I have the Act here. It says, "And be it enacted that every dam, weir, dyke, and other erections

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erections

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[Continued.]

Mr. Macartney—continued.

erections shall, after the passing of this Act, placed in or across any river," and so on, "shall be so built and constructed as to permit or allow of in any one or more parts of the same the free run or migration of salmon;" that is to say, it is general.

3138. Do you say that you have a right to put that in force, supposing there were no board of conservators?—Certainly; it could not be the board of conservators because they were not appointed in 1842, the date of this Act.

3139. Who do you say at the present time has the right; if you can show me any clause perhaps you will show it to me?—If that is at all relevant I will ascertain the fact. I do not think it is dependent on the conservators to enforce that clause; it seems to me to be a general statutory clause.

3140. I want to know where you, as a salmon fishery inspector, have power which you think you have to enforce certain things on millowners, apart from conservators and inspectors of fisheries; you stated, generally, that the whole principle of the Irish legislation had been to throw all the onus on the millowners of making efficient fish passes and putting up gratings?—I did not say the whole; I did not make such a universal generalisation as that, or did not intend to. I quoted cases where the onus was thrown on them not only with regard to gratings but with regard to fish passes.

3141. Take Clause 41 of the Act 5 & 6 Viet.; that refers to the free gaps at weirs. There is no doubt about it, that the persons who have erected any weir, dam, or dyke are obliged to provide a free gap; but do you see the proviso at the end which says they shall be fully compensated in doing so for any loss or damage they may sustain?—Yes.

3142. You see you have full compensation there, have you not?—Yes.

3143. Upon the ordinary principle?—Yes, I see; but I can bring you other cases in which the responsibility is on the millowner without any compensation.

3144. But I am going back to your statement. This is the first consolidated Act in Ireland, and we find there the principle of compensation to the millowner or the owners of dams or dykes who had to make provision for the benefit of the salmon fisheries!—In this particular case.

3145. Now go to Clause 42, which deals with weirs. There is also there a proviso that the people whose weirs, dams, or dykes are altered for the benefit of the salmon fishery owners shall be fully compensated, is there not?—Yes.

3146. And in Clause 43 there is another provision for compensation, is there not?—I may tell you this, that many of these things were very much altered.

3147. Let us go by steps. You stated that the original thing in Ireland was that the onus was thrown entirely on the millowner?—No; I think I gave cases.

3148. I am taking you to the case?—But you are simply showing cases in which it is not so thrown. I stated that there are various cases in the Irish Act of 1842 in which the responsibility

Mr. Macartney—continued.

is thrown on the millowner. I do not mean to say there are not cases in which it is not thrown on the millowner.

3149. But here is the particular clause throwing the onus on the millowner, dealing with fish passes and ladders, and there is a proviso at the end for compensation?—Now, then, refer to Clause 63; there is no compensation there.

3150. Clause 63 says, "In all dams or weirs now existing, or which shall be hereafter constructed, means shall be provided for the free migration of salmon and other fish; in existing dams and weirs similar means for migration of fish shall be provided, no injury being done to navigation or power of mills." You see there is no injury to be done to the water-power going to the mills there?—Not in the existing mills, but the first part of the clause says that in all new mills they must make a fish pass absolutely; in cases where the mills already exist there is power to make a fish pass, but that is to be done under certain conditions which recognise a prescriptive right, as it were, in the existing property.

Mr. TOWNSEND.

3151. Is it your opinion that that is an effective clause?—I should say the first part of that clause is effective; the second part of it is not very effective.

3152. Were you here when Mr. McDermott gave his evidence?—No.

3153. You did not hear Mr. O'Neill at Question 1980 ask, "But is it not the case that the law requires a free pass for fish? (A.) So I have said. (Q.) Will they not go up that pass? (A.) There is no pass made. (Q.) If the law requires it is it not your business to see that that pass is made? (A.) The law says that every builder of a weir shall construct a pass as he builds his weir, but the law puts on no penalty for non-compliance; that is as it has been read to me"—I do not think that.

3154. Someone else gave similar evidence?—I would like a proof of that statement; may I reserve that point?

3155. Then he asks, "So that the law is absolutely useless, you say"?—With regard to new mills or old mills?

3156. New weirs; and the answer is, "Yes, as far as fish passes are concerned"—I will look it up.

Mr. STEWART-KERR.

3157. The point is, is there or not a penalty for non-erection of weirs?—I may say this, that in an old Irish Act there was a power for prostrating any weir that was erected on certain rivers; I have a reference to it here. It is a power actually for knocking down a dam and making a "convenient gap."

Mr. Macartney.

3158. Will you look at the first part of Clause 63 again, with regard to new dams, weirs, dykes, and other erections. That simply says, does it not, that when any new dam, weir, or dyke is erected there shall be a pass for fish?—A provision for the free pass of fish.

3159. Can

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[Continued.]

Mr. Macartney—continued.

3159. Can you show me anything in this Bill which has been referred to this Committee which interferes with that in any way whatever?—I thought we were speaking with reference to the responsibility of millowners. My position was to prove that the responsibility of millowners with regard to fish has always been recognised in Irish law.

3160. There has been no evidence whatever from the millowners with regard to dams, weirs, dykes, and other erections, and with regard to their responsibility and non-responsibility. Is that the only instance you can point out in this Act of 1842 where there is a responsibility without compensation?—No, there is responsibility for keeping the mills shut and getting water over these passes.

3161. Will you show me where there is anything done to the injury of the millowner where there is no provision for compensation in that Act?—It is throwing a certain responsibility on the millowner to make a free pass just as it is to make a grating.

3162. But there is no injury to the working of his mill?—My position is the grating clause of 1869 saves the effective working of his mill.

3163. That has nothing to do with the dam, weir, or dyke. I want to call your attention to the fact of the making of a fish pass, dam, weir, or dyke. Nor has it ever been asserted by the millowner, it has not interfered with the effect of working his mill. Can you point out anywhere in the Act of 1842 any provision throwing on the millowners the onus of providing something for the benefit of salmon fisheries which would be to the injury of the millowner where there is no ample provision for compensation?—There is this expense thrown on the millowner in reference to various cases, and the same thing is thrown on a millowner with regard to gratings.

3164. If a millowner wanted to take away water from the river he would naturally have to erect a dam, would he not?—Yes.

3165. That is a thing he would contemplate before he went into the business?—Not the expense of erecting a fish pass over a dam which might cost him a great deal.

3166. How much would it cost him?—From 20 l. to 40 l., 50 l. or 100 l., it depends on the nature of the dam; it might cost a great deal more.

3167. Since the Act of 1842 it would be before his eyes; if he wanted to build a dam across a river he would have to erect a fish pass, would he not?—Quite so.

3168. And if he were going to start a factory he would have that before him, would he not?—Undoubtedly, and he knows also by these other Acts that when he starts a mill he has to erect a grating.

3169. The allegation of the millowner is that the erection of the gratings interferes with the effect of the working of his mill, and I want you to point out to me in the Act of 1842 any single instance where the millowner is called upon to do something for the benefit of the salmon fishery which interferes with the working of his mill where there is no ample provision for compensation to the millowner?—I have already

pointed out cases of enforced duty without compensation.

3170. Do you understand my point; in the millowner's view, placing a pass on a dam, weir, or dyke does not interfere with the working of his mill; they urge that the putting up of this grating or lattice does interfere with the working, and I point out to you that in the Act of 1842 the onus, which was thrown on the millowners of doing some things for the benefit of the salmon fisheries, was always accompanied by ample provision for compensation; that is so, is it not?—It appears to me that statement about gratings is not exactly correct, because supposing I erect a new mill I have to make a cut or channel and I have to erect a grating. It is only, according to evidence which has been given, a question of making the cut twice as wide, in order to save the effective working of the mill, that is the point I would put.

3171. How can you make the cut twice as wide when there is no room to do it?—This very Bill before us contemplates the possibility of it, but throws the cost on the conservators.

3172. But suppose you have not the natural facilities?—It has been discussed in these inquiries that it is possible to make this grating without interfering with the effective working of the mill. That is my first point. The second point is this, that if you prove it does interfere with the effective working of the mill then in the clause of the 1869 Act (which I know most about) the exemption applies.

3173. We are traveling away from the point. I want to point out to you that this onus which you said was thrown on the millowners was not thrown on the millowners at all, except accompanied by full compensation, under the Act of 1842?—I must still submit that the onus of doing things for the benefit of salmon fisheries, or rather of safeguarding fisheries from mill injury, is thrown on the millowners by the Act of 1842 without compensation.

Chairman.

3174. A fish pass requires water always running over it, does it not?—Yes.

3175. Does that affect the working of the mill. As I understand they stop these mills so that they are perfectly dry, and the fish cannot get up?—Yes.

3176. If they opened a space sufficient for the fish pass, then the water will run away, and the supply of water to the mill be to a certain extent decreased, will it not?—Undoubtedly.

Mr. Macartney.

3177. You have laid down before the Committee the principle that Irish legislation has always gone upon the steps of throwing upon millowners certain responsibilities and burdens?—Quite so.

3178. I want you to show me in the first General Consolidated Act of 1842, any instance where the millowner was obliged to do something which was to injure the working of his mill by the erection or creation of anything for the benefit of the salmon fisheries without ample compensation being provided for in the section?—I say in reply to that he is bound to put up a fish pass which in the first place is an expense,

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Mr. Macartney—continued.

and secondly, it does, as the Chairman has suggested, interfere with his water to a certain extent.

3179. Will you point out any evidence before this Committee in which anyone of the millowners called here or anyone on their behalf have said they object to fish powers, or that the fish powers interfere in the slightest degree with the working of their mill?—I say many of the gentlemen who have given evidence have certainly denied the responsibility of millowners with regard to fish.

3180. With regard to your evidence as to English rivers, can you suggest any river in England where the salmon fishery has decreased, and where the river has been polluted where the damage done to the fish has been greater from ordinary water wheels or turbines than from pollution?—I would not state a thing of that kind from my own experience but I can give you case after case from the reports.

3181. That is the injury done to salmon fishing on rivers where there has been polluting matter from works coming into them is greater from dams or other causes than from pollution?—Yes, I believe I may say it is the general principle laid down by these witnesses that the damage to salmon rivers in England is more a question of dams than pollution.

3182. In rivers where there are works pouring out polluting matter?—Well, of course, you may bring a certain case where the pollution may be more injurious than the dam, but this is the general view taken by the witnesses, that the dams have been more fatal to the salmon rivers than the pollution. It would be more satisfactory if I were to look up the cases and give them to you.

3183. Yes; there is only one turbine you say working at Galway?—Yes.

3184. Is that the Electric Lighting Company turbine?—Yes.

3185. What is the capital of that company?—I do not think it can be a very large one.

3186. Do you know whether any action has been taken there by the Board of Conservators with regard to this turbine?—I do not. I am a member of the board, but the turbine has only just been put up. I did not know it was put up until a few days ago, when I got a letter from the lessee.

3187. Do you think if a lattice like that one in the room was put up before that turbine it would have no effect on its working?—In the first place I think the lattice absolutely unnecessary. I do not see the good of such a lattice. I may say we should never get such an amount of filth from a lattice in the Galway river.

3188. What sort of a lattice would you put up to prevent fry going through?—One with wider meshes altogether than that.

3189. Much wider?—I should say much wider. Evidence was given about salmon fry going through like minnows, but salmon fry, when they go down, are very much larger than minnows; they are rather a good sized fish. I have often caught them angling in the river; they are more like specks than minnows.

Mr. Selso-Kerr.

3190. Do you think that a grating, or lattice with a slightly larger mesh than that, would be sufficient to protect the fry?—I do indeed, there

Mr. Selso-Kerr—continued.

is not the slightest doubt about it. It is not a question of small fry sailing about outside the turbine. Those are not the things we want to protect. What we want to protect is the great return of fish coming down from the upper waters.

3191. When they have their silver coat on?—Yes.

Mr. Macartney.

3192. Then you think the protection of fry immaterial, do you?—No. I am speaking about the fry as we see them coming down in the month of May from the upper waters to the sea.

3193. You are not speaking now of the very small fry?—No, because they do not move away far; they stay about where they are born.

3194. So far as I understood the evidence of the fishery people from Antrim, they came down when they were very small, much smaller than you speak of?—We do not see them at all events. One of the vexed questions about salmon is how old the fry are when they come down; a general view is that they are between one and two years old before they come; that is the theory they hold in Galway.

3195. You said generally with reference to English and Irish legislation, Ireland was always in front of England?—Yes; since 1842.

3196. Do you think there is any probability of any legislation being carried with regard to England or Scotland as to turbines?—Of course it is a matter of opinion; I may say there is a great demand amongst English conservators, as Bockland shows, for better grating clauses.

3197. When was that?—That was in 1869.

3198. Has anything been done in consequence of that?—No: the English Act was passed afterwards, and its grating clauses were a species of attempt to satisfy all parties; but I might point out that the English grating law is not as good as the Scotch one, as far as I can understand. You have taken the very worst type, as it were, of grating law.

3199. Would you be satisfied to place the Irish Salmon Fishery Law on precisely the same footing as the Scotch?—I do not sufficiently know what the Scotch is to say.

3200. Then I will not ask you about it. Do you know that there is no turbine legislation in Scotland?—I do not know.

3201. You do not know one way or the other?—No.

3202. You quoted the condition of Irish fisheries between 1842 and 1861 as having steadily improved?—Yes; but I may say this, that they went down a good deal before 1861, and the new Act was passed, which we consider the most important Act.

3203. We do not touch the 1861 Act, we only touch the 1863 Act?—There was no Irish Act in 1861; it is the 1863 Act.

3204. There was a steady improvement between 1842 and 1861, was there not?—For some time; but I believe they say that there was a going back, and then they passed the 1863 Act.

3205. I think you read something from the Report of the Select Committee about it?—Yes, I read some evidence.

3206. You said something about there being a steady improvement?—Yes.

3207. That is under the Act of 1842, is it not?—That

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[Continued.]

Mr. Macartney—continued.

—That is under the Act of 1842 and other Acts succeeding it up to 1850.

3208. Are you aware that this Bill for the moment, leaving out the English clauses, would go back to the position of 1842?—Yes. But then the Irish legislation has greatly advanced since then.

3209. But between 1842 and 1861 there had been a steady improvement, had there not?—At the latter end there was not. There was a steady improvement to begin with, but if we take Longfield, who is a great authority on the matter, he declines against the 1842 Act as imperfect, and in some respects retrograde.

3210. Do you rely on Longfield or on that bit of evidence you read to the Committee?—They are both true; there was a steady improvement from 1842, but towards the end there was a sort of lull and ebb in the improvement, and this 1863 Act was passed, which is an advance on the 1842 Act; it introduced better laws with regard to fixed engines, free gears, &c., and also introduced the turbine clause.

3211. And do you say that in consequence of this new legislation there has been a great improvement in the Irish fishery?—I believe there has.

3212. In the productive quality?—Yes, I believe there has.

3213. Do you say they send more to the market?—I have not looked up the annual statistics.

Mr. T. W. Russell.

3214. Do you send more from Galway?—Yes, we do undoubtedly; if I were to give you the statistics of the Galway fishery from 1853 onwards you would be astonished. There was one good year we have never gone up to.

3215. But there has been steady progress, has there?—Yes.

Mr. Macartney.

3216. Are you aware that the number of boxes arriving in Billingsgate from Ireland has steadily decreased between 1881 and 1889?—Possibly.

3217. They went up and down, and in 1882 fell from 10,000 L worth to 4,000 L worth?—I may say, as far as Galway is concerned, last year and the year before were among the best years we have had.

3218. They fell from 10,000 L in 1881 to 4,000 L in 1882, and then they were 5,000 L, 8,000 L, 6,000 L, 7,000 L, and 7,000 L, till in 1890 they got back to 10,000 L; you would not call that a steady improvement, would you?—No, certainly not.

3219. You would call that a very considerable fluctuation, would you not?—I should think so.

3220. Do you say that the difference in the Irish legislation makes the Irish salmon fisheries more productive than English or Scotch, and enables them to send more fish to the market?—I should think so, certainly as regards the English. I do not know much about Scotch legislation and production.

3221. Are you aware that the average number of salmon boxes sold at Billingsgate from Scotland, we will take it for 10 years, is very nearly treble that sold from Ireland?—I do not know exactly whether we are as it were to raise the whole question on this particular case. We do not send all our fish to London; we send some to Manchester.

Mr. Macartney—continued.

3222. So does Scotland send some to Manchester?—I do not know what the Scotch market is; but you could not possibly take one particular case in that way. You see there is a very much longer distance to send them from Ireland than from Scotland; they have to come across the sea. A good deal of the Irish fish goes to the Liverpool market rather than to London, though it is not so good a market as London. Then, of course, Dublin is a very fair market, though not so good as the English market.

3223. I want to know how far you press what you stated, that the Irish legislation had a tremendous effect upon the productive qualities of salmon fisheries?—Take the condition of fisheries before the legislation began, that is to say before 1842; take this Report of 1856, or take what Longfield says, and you will find that the Irish fisheries were almost in a state of ruin. I know, with regard to the Galway fishery, it was simply worth nothing compared to what it is now, and from that time partly, I do not say altogether, owing to legislation, and partly owing to increased attention, to better markets and railways, and other things, there is no doubt there has been an enormous increase in the value of Irish fishing. Mr. Ashworth says here: "The Irish Fishery Commissioners in their Report of 1857 state that the value of the salmon in Ireland is 300,000 L." Sir Thomas Brady, I believe, stated in a letter in the "Freeman's Journal" last week or the week before in reference to this inquiry, that it is now 600,000 L.

3224. So that the rate of progress, and the improvement since 1863 have not been so rapid as it was before, have they?—Perhaps not, any rate of progress naturally comes to a limit.

3225. You know that this Bill simply goes back to the position between 1842 and 1863 as far as Irish legislation goes, do you not?—Quite so.

3226. And during the whole of that time there was a steady improvement in the productive qualities of Irish Salmon Fisheries, was there not?—Quite so, except as already explained at the end of the period, but there has been a decided improvement since 1863 you know. It may not have been so rapid. To go back beyond 1863 is to repeat many of the most important of the Irish Fishery Laws.

Mr. Selous-Kerr.

3227. Mr. Macartney asked you your opinion about Section 4; if Section 4 in his Bill provides that the whole expenses of preserving the salmon are to fall upon the shoulders of the conservators and fishery owners, you entirely object to it, I understand?—Entirely.

3228. Also if that clause lays down that the effective working of any mill shall not be interfered with by any protection of the salmon fishery interests, practically does not that mean that the salmon fishery will not be protected at all?—Yes. But as far as the clause of 1869 is concerned, it seems to me that that clause itself saves the effective working of the mill.

3229. I will put it shortly: if that is the meaning of the clause, you do not agree to it in the least, I understand, and you strongly object to it, do you?—Yes, if it throws on the board of conservators the necessity of working. I undoubtedly object to it altogether.

Monday, 2nd May 1892.

MEMBERS PRESENT:

Mr. Cox.
Sir John Whittaker Ellis, Bart.
Mr. Macartney.

Mr. O'Neill.
Mr. Seton-Karr.
Mr. Tomlinson.

SIR JOHN WHITTAKER ELLIS, BART., IN THE CHAIR.

MR. WILLIAM PETRIE, called in; and Examined.

Mr. Seton-Karr.

Mr. Seton-Karr—continued.

3230. YOU are the lessee of the Sligo Salmon Fishery, are you not?—Yes.

3231. How long have you been lessee of it?—Forty years.

3232. Are there many mills in your district?—There are five altogether.

3233. Are you acquainted with them all?—Yes.

3234. How many of them have turbine wheels?—One; it has got two turbines.

3235. Which mill is that?—At the mouth of the Sligo river; Pollexfen's Sligo Mills.

3236. Is it known by the name of the Sligo Mills?—Yes.

3237. What kind of mill is it?—There are three breast wheels and two turbines; it is a flour mill.

3238. When were the turbine wheels put up?—In 1878.

3239. Were they protested in any way?—They got people from America erecting the wheels and they were in a hurry to start them back again, and they had neither gratings, lattices, nor anything put up.

3240. Had they nothing to prevent fry or salmon going in?—Nothing whatever.

3241. Was that because they were in a hurry to put them up?—Yes, they wanted to let the people get back to America again.

3242. Do you know of any injury done to salmon fry by these turbine wheels?—Yes.

3243. Will you tell the Committee what it was?—In May 1878 they commenced work, and in June, when the first freshet came down, they got stopped one morning. The men came for me and we got the sluices let down, and we found that they were full of the remains of fish; some of the tails and heads were to be seen.

3244. What kinds of fish?—Fry and salmon, and some eels; the turbine could not move.

3245. In other words, it was choked with dead fish?—Yes, it was choked with dead fish.

3246. Were there many fry amongst the eels and salmon?—There were not many eels; there were a great many spent salmon; enough to fill two large wash-tubs was taken out.

3247. Was it full of fry?—It was full of the remains of fish.

3248. Were the fry in large numbers?—It is nearly all fry that goes down in the months of May and June.

3249. Nearly all fry, with one or two spent salmon?—There were one or two spent salmon, but the majority of fish with which it was choked was fry.

3250. On their way down to the sea?—Yes, just as they were within a few yards of the salt water.

3251. Can you give the Committee any idea of how badly it was choked; could the water run freely through the turbine?—It stopped all at once, and the miller did not know what was wrong with it.

3252. Was it stopped entirely by the dead fry?—The water could not pass through.

3253. Did you yourself see this?—I did; and I stood by till it was quite dry and the miller went down and took the rap off. It took them nearly half a day to get it cleaned.

3254. How soon was this after the mill was started?—The fish were coming down about the month of June; it was about the first freshet.

3255. In other words, it happened immediately the fry began to go down?—Exactly.

3256. Then you have no doubt in your mind that this machinery killed the first fry that went into it?—I believe it did.

3257. What did you do after that?—I reported it to the Inspectors of the Irish Fisheries.

3258. What happened?—Sir Thomas Brady came down the next morning, and he stopped the turbine. Then he said that they must put down bars two inches from one another, and put a lattice inside the bars.

3259. He ordered the stopping of the turbine until this lattice protection was put up, did he?—Yes, he stopped it; then he ordered the lattice to be put inside of the sluices; but with the force of the water coming down there were a great number of fry killed outside the lattice.

3260. The water was coming down so rapidly?—Yes; but when the lattice was changed and put outside the sluices it worked first class; it is like a window nearly.

3261. I understand what you say to be this, that

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Mr. PERRIE.

[Continued.]

Mr. Selon-Karr—continued.

that they first put lattices inside the sluices?—Exactly.

3262. And then they found the fry were killed?—Yes, with the force of the water.

3263. Then they put the lattices outside the sluices?—Yes.

3264. And then they found it work very well?—Yes, it has been working first class since.

3265. Do you mean they had a double set of latticing?—No; they had an extra one.

3266. They take out the dirty one and put in a clean one, do they?—Yes, they put in a fresh set.

3267. At what dates were those put in?—It was nearly July before they got them all finished?

3268. July of what year?—1878.

3269. Have they been in ever since?—Yes, and working first class.

3270. And the miller has made no complaint, has he?—No.

3271. It has never stopped the working of his mill, has it?—It has never stopped an hour since; they have poles for clearing the lattice.

3272. Is there anything peculiar about this turbine wheel, or is it different from any other turbine wheels that you know of?—I do not know much about them; they are smaller than I have seen at other places.

3273. But still it is an ordinary kind of turbine?—Yes; it is an American machine, as the miller told me.

3274. Is the mill race more rapid than other mill races?—No; the water comes down very quietly.

3275. It is an ordinary run?—An ordinary run.

3276. Do you happen to know at what pace the water runs in that race; do you know the fall?—There is very little fall; it is an ordinary mill-race. I suppose there is not a foot fall in half-a-mile.

Mr. TONNISON.

3277. Is that in the race or the river?—That is in the mill-race.

Mr. Selon-Karr.

3278. How much of the flow of the river does this mill-race take; does it take nearly all the water?—It takes all the water in the summer time, this year especially.

3279. During what periods of the year do you have these fry-guards up?—April, May, and June.

3280. And the rest of the year it is left open? They lift them up at once when I tell them.

3281. And you do not want them down except in those three months?—No.

3282. Do you think that in the absence of those fry-guards very great injury would be inflicted on the fishery?—I believe it would ruin the Sligo fishery altogether. I had three very bad years after the turbine was put up. The takings fell away one-half.

3283. How long was the mill running without these fry-guards?—About two months.

3284. And you say your fishery suffered very much in consequence?—Yes, in the two years after.

3285. What you mean to tell the Committee is 0.80.

Mr. Selon-Karr—continued.

that during those two months so much injury was done to the fry that your fishery was damaged for the following two years?—That is my opinion.

3286. In other words, so many fry were killed in that two months going down to the sea that the number of fish coming back the next two years was seriously diminished?—One-half, and then the following year one-half again.

3287. What years were these?—1879 and 1880.

3288. And since the fry-guards have been used in the way you describe, has your fishery improved?—It has, but it took up to 1883 to get good again, and last year was the best year for the last 40 years.

3289. Do you attribute that at all, or to any extent, to the fact that the turbine is protected?—We had very good seasons before the turbine was put up.

3290. And do you think it was because the turbine has been protected that your fishery has improved?—That is my opinion.

3291. And that opinion is fortified by the fact that before the turbine was there your fishery was improved?—Yes.

3292. That while it was unprotected your fishery went down, and after it was protected it went back again to as good a state as it was before; was that so?—Yes.

3293. Is there a bye-wash?—There is; when the mill stops the water flows right over the bye-wash.

3294. So that when the mill is stopped, and the bye-wash is open, the fish that have collected in the mill-race can go down into the river?—They can fall right over.

3295. Is that opened every night?—No, only on a Saturday night and Sunday night.

3296. But you are quite satisfied with that arrangement, are you?—I am; we have no trouble or bother.

3297. Have you seen men taking the remains of fish out of the water in buckets before the fry-guards were put up?—Yes; they got drowned up against the lattice inside the bars.

3298. Describe to the Committee exactly what you saw on those occasions?—On those occasions I got the sluices let down and the whole place was dry.

3299. That was before the fry-guards were put up, was it not?—No, after the fry-guards were put up inside the bars. We got buckets full the following morning, and Sir Thomas Brady came and stopped all that. He came back the second time when I reported that to him. I reported to Sir Thomas Brady about the fry being found dead up against the lattice, and he came down and changed it to the outside, and it has worked first class ever since.

3300. Then when the fry-guards were put up in the position you and Sir Thomas Brady required, all that injury to fry was done away with?—It was; I have not seen one dead since.

3301. Were the fry-guards you speak of anything like the one we have here?—Just the very same, only twice as deep.

3302. Were there openings like that?—Just the same.

3303. But there was no dirt or wool?—No; I suppose

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[Continued.]

Mr. Seton-Karr—continued.

suppose there is a little dirt which comes down in July, grass, weeds, and so on; and then they have a hose with which they wash it.

3304. How often do they change the fry-guards?—Every morning.

3305. That is very easily done, I suppose?—They can do it in two or three minutes.

3306. And by that means they are enabled to clean the fry-guards easily, are they?—Yes, they can get the hose and wash it away in two or three minutes.

3307. The mill men do that, I suppose?—Yes.

3308. Do they ever complain of having to do that?—I never heard a word of complaint from the miller.

3309. And the result is that they have plenty of water for their mill to work with?—Yes, except when the water is scarce.

3310. I am talking of the time when there is plenty of water; when there is plenty of water the fry-guards do not in the least interfere, do they?—I have not heard the least complaint.

3311. In your opinion do you think it is possible for fry to go through any kind of a turbine alive and uninjured?—There is not a quarter of an inch to spare; it is almost the same as a pair of mill stones.

3312. Then I gather you are certain that young fry cannot go through a turbine alive?—I do not believe they can pass through, a single one, alive.

3313. And you have had a good many years experience of these turbines, have you not?—Since 1878.

3314. When the fry have their silver coats on they are bound to go to the sea, I suppose?—Yes.

3315. They must go or perish in the attempt; that is what it comes to, does it not?—Yes.

3316. Have you read Mr. Macartney's Bill?—I have.

3317. Do you object to it?—I do.

3318. What is your chief objection to it?—On account of the fry, and taking away the lattice.

3319. Do you think under the provisions of that Bill the millers will not be obliged to protect their turbines; is that it?—Yes, and the Conservators have no funds to do it.

3320. And the Conservators, on whom the Bill would throw the burden, have no funds to do it with, have they?—None.

3321. And even if they had funds to do it with, what is your opinion?—I think they would not be able to please the millers.

3322. You think it would be very hard for them to please the millers. Then they would have to enter on the miller's land to put up the fry-guards, would they not?—No matter what you might do you could not please the miller. Besides, they have always some men going about, so that they could change them in a few minutes without the slightest difficulty.

3323. I suppose the fact that the Conservators were obliged at their own expense to put up these fry-guards would make the millers and millmen very careless as to whether they broke the fry-guards or not; is not that so?—Yes; I

Mr. Seton-Karr—continued.

spend 200 £ a year altogether in the river, and I get 68 £ of that from the Conservators.

3324. In other words, you have to spend 139 £ more than you receive in protecting your fishery?—Yes, and I employ over 200 men altogether.

3325. You employ over 200 men in your fishery, do you?—Yes, in the public fisheries.

Mr. Macartney.

3326. But that is including the coast fishery; that does not mean in connection with the river fishery, does it?—But all the salmon goes to the rivers.

Mr. Seton-Karr.

3327. Supposing your fishery were ruined or destroyed, all these men would be thrown out of employment, would they not?—They would; if the turbines in the Sligo river and other rivers where turbines are allowed are not protected, you would get no fish; if no fry goes down you cannot expect them back.

3328. In other words these 200 men are dependent on the supply of salmon for their livelihood; is that so?—There are 200 who are employed in the river and outside constantly, and 100 are occasionally employed, who earn bits of lace at other times.

3329. What do they fish with?—Nets.

3330. It comes to this, that 200 men are entirely dependent on the fisheries?—Yes.

3331. And 100 or more are partly dependent on them?—Yes, in the summer time.

3332. Do any of the upper proprietors in the Sligo district pay anything towards the protection of the fish?—Not I, &c.

3333. The lower proprietors have to do the whole thing, have they?—Everything.

3334. Then do you think it would be a very serious public calamity if this Bill were passed into law?—That is my opinion. I pay about 3,000 £ a year for wages, and so on.

3335. And do you think that, supposing these turbines were not protected in the way they are now protected in your district, your fishery would be practically ruined?—That is my opinion. There is one thing I should like to say, the Sligo is a very early fishery, opening on the 1st January, and our fry there is very small.

3337. The fry vary a good deal in size in different rivers, do they not?—Yes.

3338. Do you mean to suggest that in other rivers the fry guards need not necessarily be so small?—I think so.

3339. Your fry is particularly small?—Very small fry.

3341. Did you happen to see those specimens of fry that were brought here some time ago; are your fry smaller than that?—Our fry are only about three inches and a-half long. There is another fishery near me where they are about six inches long.

3341. Supposing the fry-guards that are used to protect the turbines in the Sligo Mills do not interfere with the working of the mills, in other rivers where the fry are larger, there would be still less chance of fry-guards interfering with the

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[Continued.]

Mr. Seton-Kerr—continued.

the working of the mills, would there not?—That is so; you would want different sizes for different sized fish.

Mr. Tomlinson.

3342. I understood you to say the mill stream went very slowly, and with only a drop of about a foot a mile?—Yes, it is very slow; it hardly moves.

3343. I suppose the result of that is, that at the turbine there is a great head of water?—Yes, very considerable.

3344. You say you have had these lattices down in April, May, and June?—Yes, in April, May, and June.

3345. And those are the months you think they are required?—Those are the months we require them at Sligo.

3346. Are you aware that in the Act of 5 & 6 Vict., which was the first of this series of Acts, the months of protection were given as March, April, and May?—Yes.

3347. So that as the law at present stands, you could only keep the lattices down in the month of June by arrangement with the miller, could you not?—Yes.

3348. So that you are not, in fact, satisfied with the state of the law as it stands at present, are you?—We would give the miller the month of March and he would give us the month of June. Then if the water is very low in March we generally put them down in the middle of March.

3349. Still for complete legal protection you would wish for power to keep them there in the month of June?—Yes, during the month of June.

3350. Has the water in the river diminished?—No.

3351. Have you heard the evidence which has been given here before by previous witnesses?—I heard the evidence on Friday.

3352. Did you hear the witnesses who spoke about the condition of the tributaries of the Bann?—No, I did not.

3353. When they said they considered the average amount of water in the river had diminished on account of draining in the upper reaches, that would not apply to your river?—No, we have no drainage in our place.

3354. What sort of a river is it?—Lough Gill is the millpond; it is about 17 miles long and three miles wide.

3355. Is that the great source?—Yes; the fish go and breed in the shallow water 20 miles from Sligo in the months of November and December.

3356. In the mountain streams?—Yes, in the mountain streams.

3357. What do you consider the annual value of the fishery in a river like yours; what are you rated at; yours is a several fishery, is it not?—Yes; I am rated at 140 £ a year.

3358. Does that include the fish in the lough?—There is nothing at all outside; you only pay a license; the fishermen pay a 3 £ license.

3359. Your several fishery is in the river, is it?—Yes, in the river for about five miles.

3360. Do you fish with nets there?—Yes; by nets.

Mr. Tomlinson—continued.

3361. It is not rod fishing, it is net fishing?—There is no rod fishing.

3362. I understood you to say that in July nothing comes down the river that would materially interfere with a lattice of the kind which has been produced?—There is a little grass sometimes.

3363. What is it that goes down in July?—Bits of grass that grow on the bottom of the river. Then people throw stuff into the river; I have summoned them for it.

3364. I presume that does not matter much, because the grating is then taken up?—Yes, there is very little stuff until the dirt comes down in the fall of the year.

3365. As I understand, before the lattice you mentioned was put up there was an opening with bars, was there not?—There was nothing at all.

3366. You described an alteration of the arrangement?—Yes; I telegraphed to the inspectors and they came and put down two inch bars right across before the turbine, and then they put the lattice down behind them, but they found it did not work and then they changed it to the outside of sluices.

3367. Does this grating remain throughout the year?—It does, to keep sticks from going down.

3368. That grating would stop all the spent fish, I presume?—It does stop all the spent fish.

3369. How do you account for the fact that the fry would be killed by coming against the lattice when it was put behind and not when it was put in front of the bars?—There was such a rush of water that the fry got up against those gratings and got drowned with the rush, but when they were lifted up the water came quietly in and I have never seen one dead since.

3370. As I understand, the alteration was not so much an alteration of the position of the lattice as an alteration in the mode of using the sluices?—The sluices were down, and the lattice was inside; and with the force of water the fry went down and got drowned up against it; but since we have changed it to the outside there has been no trouble, and they are more easily cleaned, too.

3371. Were they put into more still water, or what?—No, they were put in slanting before, but they are now put straight up and down in this way (*derrilley*).

Mr. Seton-Kerr.

3372. How did the fry get killed before?—When the sluices were lifted up the fish went down under the sluices, and with the force of the water they got up against this grating and could not get away, and got drowned. The gratings now are outside the sluices, outside of everything.

Mr. Tomlinson.

3373. What is the constitution of the Board of Conservators at Sligo; whom does it consist of; how many members are there?—Sixteen.

3374. What do they subscribe each?—Nothing at all, except that *ex-officio* magistrates pay 1 £ a year; the J.P.'s are *ex-officio* conservators.

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3375. And

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[Continued.]

Mr. Toulmin—continued.

3375. And they pay 1*l* a year?—Some of them.

3376. Are they not bound to pay even that?—They are if *ex officio*.

3377. But those who are not *ex officio* are not bound to pay?—No; they are elected by the votes of those who take out licenses.

3378. If it were not for you as owner of the several fishery, there would be no means of obtaining protection at all, would there?—None; I pay 130*l*. per year, and employ my own time and that of my sons in improving the thing; digging up the spawning beds, and so on.

3379. How many watchers do you employ?—About 100; that is calculating my own fishermen; there are 17 men on the banks of the river, and then there are 20 I keep on the whole year.

3380. At what time of the year do the spent fish come down?—About the 15th April generally. They have not got down much this year on account of the water being so low; they are all lying in the pools.

3381. Do the fish find any difficulty going up the river ever?—No, that law is well arranged; there are plenty of ladders.

3382. Do they work properly?—Yes, they have been there since 1855.

3383. Then you find no difficulty so far as ladders are concerned?—The fish can get up very well; the difficulty is getting them down.

3384. You do not find the difficulty other witnesses have spoken of in securing the permanence of fish ladders?—No, there is no trouble or bother. I send a man every Monday morning to look after them. After a flood there are always some weeds and stones there, but they are easily cleaned.

3385. Are you in favour of having gratings at bend race as well as tail race?—Not now; the tide flows half-way up as far as the wheels. They have to stop the wheels sometimes at high water.

3386. Do you think in that case there is any danger of the fish going up the river getting into the mill race instead of the main stream?—Not in our river; there is in the Ballisodare, five miles from us.

Mr. Seton-Karr.

3387. You said that your river was an early river, and the fry was smaller; do you think if the fry were larger they would have any better chance of getting through the turbines alive?—I do not believe they would.

3388. They would be killed just the same, you think?—Yes.

3389. The fact that they were particularly small fry would not render them more liable to be killed?—It would not. The miller lifted up the turbine and let me see it about a fortnight ago.

3390. The larger the fish the less chance of their getting through?—Yes.

Mr. McCartney.

3391. Have you had experience of other turbine wheels except this one you have mentioned?—None, except at Collooney, where I have seen some once or twice.

Mr. McCartney—continued.

3392. Can you tell me the name of the turbine you are speaking of?—No, I could not find it; I looked for it, but the name was washed off by the action of the water.

3393. Are you aware that with regard to the modern wheel in use now it would be impossible to get it choked up in the way you have described?—No.

3394. From your description of this wheel, I fancy it is one which is obsolete at the present moment. There were a large number of glands or buckets in it, were there not?—There were 18 places where the water goes in; I counted them.

3395. I understand that the lattice and the bars are outside the race altogether?—Outside the sluice.

3396. Outside the sluice leading to the race?—Exactly.

3397. So at the moment the water gets into the race there is nothing between it and the turbine?—That is only about 20 feet.

3398. How long is the head race?—Between where the bars are and the grating there is only 20 feet.

3399. How long is the head race?—I could not tell you exactly.

3400. Is it a quarter of a mile long?—Yes, it is; it comes from Lough Gill.

3401. I understood that the lattice and bars were outside the race altogether?—No; they are outside the sluices that are let down for drying the place.

3402. How far was this lattice from the turbine when it was inside the bars?—About 15 feet.

3403. And now you say it is, how far?—About 50.

3404. And how far are the bars?—The bars again are a foot from that.

3405. So that the bars are about 18 or 19 feet from the turbine?—We have a two-inch bar first outside.

3406. How far are they away?—About 21 feet; then we have the lattice inside, and the sluice inside that again.

3407. I understood that now the lattice was outside the bars?—No.

3408. Which side of the bars is the lattice at the present moment; is it between the bars and the turbine or outside the turbine?—The bars are first and then comes the lattice, and then comes the sluices; the three are together within about four feet.

3409. So that the lattice is nearer the turbine than the bars?—Exactly, about a foot.

3410. And you account for the killing of the fry by the fact that you saw the current was stronger outside the bars than between the bars and the turbine?—That is when the lattice was inside.

3411. I understand you to say that it is now inside the bars, or is it now between the turbine and the bars or on the other side of the bars?—It is inside the bars; it was inside the sluice.

3412. Is the lattice between the turbine and the bars?—Yes.

3413. Formerly it was outside?—Inside altogether; it was inside the sluice before; now it is outside.

3414. I want to know which side of the bars

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[Continued.]

Mr. Macartney—continued.

it is; it was once on the outside of the bars, was it not?—No, it was never outside.

3415. I really do not understand you; please describe it to me on a piece of paper?—(*The Witness explained across to the Committee.*) The change we made was that we put the lattice in front of the sluice instead of behind it.

3416. You say this turbine began to work in May 1878?—Yes, in May 1878.

3417. And that in the month of June it was stopped?—Yes, choked.

3418. I understand that your fry goes down in April, May, and June?—Yes, April, May, and June.

3419. So that whatever damage this may have done in June, it worked for the greater part of three months without being stopped?—It commenced working in May.

3420. Did it work for a month, do you think?—It worked for nearly a month.

3421. Without being stopped?—Without being stopped.

3422. And all that time fry were going down?—They must be going down.

Mr. Seton-Kerr.

3423. I think you said it was choked up shortly after the first freshet or flood?—Yes, it got choked up at once.

3424. And it was that freshet or flood that brought the fry down for the first time in large quantities I understand?—Exactly.

Mr. Macartney.

3425. Do you attribute the loss to your fishery to the effect of those turbines?—I think there must be a lot of fish killed in the month of May. We had very bad seasons two or three years after.

3426. Are you aware that the fishery returns for county Sligo give a totally different account?—I do not know, but here are my books which are better.

3427. So that the inspectors' returns are not to be depended on, you say?—I do not know.

3428. You do not agree with them?—I do not know.

3429. They say "the general state of the salmon fishery in the district is favourable"?—That may be in a good many places; it was not so with me.

3430. There is no mention in their reports for that year or the year after, of any injury having been caused by the turbine; but you reported it, did you?—I reported it and Sir Thomas came down, and he came down the second time.

3431. You object, I understand, to Clauses 4, 5, and 6, because they throw the expense of erections for the preservation of fisheries on the Board of Conservators?—We have not got funds for that.

3432. You have no funds?—We have no funds.

3433. Are you a conservator?—I am an *ex-officio* conservator.

3434. Do you hold the opinion that those who are carrying on another industry should provide, out of their own pockets and out of the profits of their industry, for the protection of an industry

Mr. Macartney—continued.

which you are carrying on and which brings them no profit. Is that your position as a fishery owner?—We have no funds to spend.

3435. I am talking to you as a fishery owner. I am not talking about the conservators, because it appears to me they do not take any trouble about anything; they are ornamental?—Well, I do not know.

3436. They do not subscribe anything, do they?—Not a shilling.

3437. Except when they happen to be fishery owners, the conservators take very little interest in it at all, do they?—Very little.

3438. Are there any other rights of angling besides yours?—There is only a little angling; perhaps a score of fish are killed in the year.

3439. Is it your view, as an owner of fisheries, that the cost of all the erections which are for the protection of the industry which you are carrying on should fall upon and be taken out of the pockets of another body of men, who are carrying on a separate industry?—I think the millers should look after it.

3440. That is your view?—That is my opinion.

3441. Though they do not make a farthing profit out of it?—But they earn more than us.

3442. That is so in any profession, is it not; some industries make money at one time when others are going down?—I lost a great deal of money for four or five years after the turbine was put up.

3443. Is it your view that the industry that is making most money in Ireland, for the time being, should pay for your gratings and other erections for the protection of the salmon fishery? Is it your view that you should have a right to call upon any industry in Ireland, which happens to be most prosperous, to protect your interests?—I think it is the miller who should do it.

3444. Is that because they are making more money?—I do not know about that.

3445. Do you say the rolling mill industry has been making progress?—Not in our part.

3446. Then do not you think that would be a good reason for exempting the proprietor of the corn mills at Sligo, say, from the expense of putting up gratings?—I think not.

3447. Though he is not doing very well?—I think not.

3448. You say you employ 200 men all the year round?—Yes; well the water keepers are not employed all the year round.

3449. How many water keepers are there?—Eighty.

3450. That leaves 120?—But then I have 20 men again whom I send up in the spawning seasons; then we have 300 men along the shore who work for about three months a year.

3451. But they have nothing to do with the fishery, have they?—If the fry were to be killed they would not have any fishing.

3452. But they are partially agriculturalists and partially fishermen?—Exactly; they fish for three months in the year, and farm for nine months.

3453. And do not do badly, I suppose?—Sometimes they do; they did very well last year.

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3454. Are

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[Continued.]

Mr. Macartney—continued.

3454. Are they better agriculturalists or better fishermen?—They are very bad farmers.

3455. How many men have you in permanent employment?—About 120 altogether.

3456. What is the result of your fishery; I am obliged to put these questions, I find that when a Committee sat in 1863, the Shannon fishery were obliged to give the Select Committee a detailed account of the profit and loss, and I intend to go into this question; I do not want a detailed account?—I will tell you my rent; it is 430 *l*.

3457. What are your average profits?—Last year I cleared 500 *l*.; the year before that I cleared 100 *l*., and I lost 513 *l*. in one year, 1880.

3458. Do you often lose or more often make money?—I did badly; we all did badly, and the fishermen too.

3459. You do not attribute that to the turbines, do you?—I do, sir; you must remember I work very hard. I have three sons who help me, myself, and my daughter I keep in the office.

3460. You object also to the clauses of this Bill, because you say it would be impossible to please the miller, do you?—I think so.

3461. Are you aware that the question of the millers has nothing whatever to do with it; that it would depend on some one else altogether to decide whether you were justified in putting up gratings; the miller has no option in the matter; he has only got a right to defend his interests just as you have got a right from his point of view of attacking them; he is not the person who decides whether the grating is to be put up or not?—I do not know where the funds would come from.

3462. I am not talking about funds; I am pointing out that the miller has no say in the matter; the miller might be able to prove that the Board of Conservators was attempting to do something which was injurious to the working of his mill, and if he could not prove that of course you would be entitled to put up the gratings or anything else necessary for your preservation?—Yes.

3463. I may take it from you that the Board of Conservators, except where they are salmon fishery owners, are a necessity; they do practically nothing at all?—Yes.

3464. So that the Board of Conservators, so far as Sligo is concerned, are practically fishery owners?—Exactly.

3465. So that everything that is done is done by fishery owners?—Yes.

3466. A great deal has been done to improve the fishery there by the introduction of ova, has it not?—Not with me.

3467. It is so in the Sligo river, is it not?—No; at Ballysodare Colonel Cooper has. He gets them from Scotland, Ballyshannon, and he gets them from the Rhine.

3468. Does that river flow into the Sligo Bay?—Yes.

3469. So that you get the advantage of anything that goes on in the Ballysodare river, do you not?—No, our season is over in Sligo. Now I commence in January, and I stop about the middle of May, and Ballysodare does not get

Mr. Macartney—continued.

much until June, so that they are all flowing in on a way.

3470. So that none of the Ballysodare fish could be got by you?—No; we stop in May, and they commence in the middle of June. I suppose they have not got 20 fish in Ballysodare yet, and our season is over in Sligo; there have been thousands of pounds spent in Ballysodare.

3471. Who gets the advantage of all the fish in the Ballysodare river?—Colonel Cooper, who is the next witness.

3472. Is that the only turbine you have ever seen working in your life?—I have seen five altogether; there are three in Collooney.

3473. Are they the same sort of turbines?—Yes, but they have a larger fall.

3474. Are they protected in the same way?—The very same way, and there have never been any complaints; I know the owner very well.

3475. Do you know what power this turbine develops?—I do not know; they have eight pair of stones, I know.

3476. But you do not know the power of the number of revolutions?—Seventy revolutions.

3477. That is the Sligo one, is it?—Yes, in the Sligo one; I asked the miller who told me that.

Mr. O'Neill.

3478. I heard you say you took up a good many dead fish in this mill race?—Yes, inside the sluices.

3479. And you say all of those were drowned by being pressed against the lattice, do you?—Yes.

3480. Did you ever find any below the turbine dead?—No, none.

3481. You do not know that the turbine killed any fish, do you?—Yes; it got completely choked at one time, and had to be cleaned of the fish bones and heads, and all sorts; they had to take off the cap of it to get it cleaned, and it took them half-a-day.

Mr. Cos.

3482. I understand you only found them on one occasion?—Yes, that is the only one occasion.

3483. Where is this mill?—Near Victoria Bridge; you go across the bridge.

3484. I want to ask you about the Conservancy Board; what do you say is the franchise for the election of members to the Board?—Any one whose Poor Law valuation is over 100 *l*. a year is an *ex officio*, so that only Colonel Cooper and I can act. Then a magistrate who pays for a license can act as a conservator *ex officio*, and the rest are selected by the votes of those who take out licenses. If you take out a 3 *l*. license you have two votes; if you take out a 1 *l*. license you have one vote.

3485. How many votes have you?—I suppose I have about 30.

3486. Have you any suggestion to make as to how that ornamental board can be improved?—I think it is working very well.

3487. But you said there were only Colonel Cooper and yourself who took any interest in it?—That is all.

3488. How

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Mr. PETRIE.

[Continued.]

Mr. Cor—continued.

3488. How can you say it is working very well?—We have not much money to spend.

Mr. Seton-Karr.

3489. I do not think you told the Committee what the cost of these fry guards that were put up were; it would not not be much, would it?—They would not cost much.

3490. Can you give us some idea?—I could not tell you.

3491. Would they cost 20 l.?—I think not, but I could not say; I do not know what wire costs.

3492. Can you give us no idea, roughly; would it cost 30 l., do you think?—I think not; but I do not know what they would cost. I know the first one Sir Thomas Brady ordered was too small, and then they got one like that one we have in the room.

3493. But the whole thing is not at all an expensive plant, I suppose?—I know if I got 20 l. I would take it all up, and put in another lot. Colonel Cooper can tell you more about it than I can.

Mr. Macartney.

3494. Assuming they would cost 20 l. or 30 l., would that break the fishery owners; or would it pay them or not pay them to go to that expense?—It is looking after them to keep them clean, which is expensive.

3495. I thought you said it was not much trouble?—It is not, if you do it once or twice a day.

3496. Do you think it would be worth the while of the fishery owners to have the expense put upon them?—If the millowner would not do it, we could do it.

3497. You think it would be worth your while, do you?—If the miller was not bound to do it I would do it.

3498. Because it would be quite worth your while to do it, would it?—I think so.

3499. That is from your point of view, is it?—Yes, that is my opinion.

Mr. Seton-Karr.

3500. Your point is not so much a question of expense; you think it is fair that the millowner should put up and have the responsibility of looking after those fry guards, do you not?—He is on the spot, and ought to do it.

3501. Your objection is not to the expense, which is small, as I understand you?—Not so much.

Mr. Seton-Karr—continued.

3502. But your point is that the millowner should be made responsible for having that guard up?—He should.

3503. If he is not responsible for it then, he or his hands might break it down with impunity, and you would have the expense of putting it up again?—Yes, they might do some mischief in the night. It would be very easy for them to smash them up and throw them away.

3504. And you think it is only fair that the millowner should put them up and look after them, do you?—Yes. Anyone might smash them.

3505. As long as he has the responsibility you are quite willing, as a fishery owner, to do your best to help him, are you not?—Yes, and always did.

3506. To keep it up and look after it?—Yes.

3507. As to these 200 men who are only partially dependent on the fishing industry, do they earn more from the fishing than from farming their land?—Twice as much.

3508. In fact they live chiefly on the fishing, do they not?—Yes.

3509. The other is only a small consideration?—Exactly; and I forgot to mention there are over one thousand men employed, about 20 miles from me.

Mr. Macartney.

3510. Do they only fish salmon?—Yes, that is all.

Mr. Seton-Karr.

3511. Are they in any way dependent on the supply of salmon from your river?—I think not.

3512. But they live by salmon fishing?—Yes.

3513. One other question with regard to the kind of turbine. Mr. Macartney asked you whether this was not an obsolete kind of turbine; but as a matter of fact your point is that you want the fry kept away from the turbine, no matter what kind of turbine it is?—Yes.

3514. And these fry-guards do that, do they?—Yes.

3515. So that it does not matter whether it is an old or a new turbine?—Quite so.

3516. The point is; the fry have not the chance of going into it now?—Yes.

3517. And the miller never complains, does he?—I meet the miller every day, and he never complains of one single thing.

Colonel EDWARD HENRY COOPER, called in; and Examined.

Mr. Seton-Karr.

3518. I BELIEVE you are the owner of the salmon fishery in the Ballisodare river?—Yes.

3519. In what district is that?—It is in the Sligo district.

3520. Can you give the Committee some idea what number of men you employ, and the extent of your fishery?—My fishery is a several fishery; it was created by an Act of Parliament about 50 years ago, which gave my late uncle the power of buying up the rights of fishery in the bay, and 0.80.

Mr. Seton-Karr—continued.

of erecting salmon ladders; and it created a several fishery, which I succeeded to nearly 30 years ago.

3521. May I ask you to explain what you mean by a several fishery; I do not think the Committee know what you mean?—It means that I have the sole right to the fishery.

3522. It is chiefly a salmon fishery, I suppose?—It is a salmon fishery.

3523. How many men do you employ?—I employ

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Colonel COOPER.

[Continued.]

Mr. Seton-Karr—continued.

employ about 15 fishermen for four and a-half months in the year fishing, and six water keepers for about two months in the winter; and I have a staff of water keepers, which varies in number along the river. The number varies according to the requirements, but I suppose there are from 30 to 35.

3524. I think you said your uncle expended a large sum of money in obtaining the Act?—He spent a large sum of money in obtaining the Act, and in erecting the salmon ladders; they were very high and very expensive to erect.

3525. Are they over some falls at the mouth of the Ballisodare?—Over two of the falls at the mouth of the Ballisodare and Collooney.

3526. In other words your uncle erected the fishery?—He did; you may call it an artificial fishery.

3527. Are there any mills on your river?—There are several mills on the river, but the principal mills are at Ballisodare and Collooney. At Ballisodare Mills at present there are no turbine wheels, but the lease has almost expired, and the miller naturally has not done much to it lately. I have renewed the lease of that mill now; there are wheels on the ground ready to erect, and I have no doubt he will erect them.

3528. Turbine wheel?—Turbine wheels, and at Collooney there are three turbine wheels; two on my side of the river, and one on the other side of the river.

3529. How long have they been in operation?—I think they must have been there between 20 and 25 years.

3530. Are they the ordinary kind of turbine wheels?—I should think they were the earliest pattern of turbine wheel.

3531. Are they protected at all?—By fry guards?

3532. Yes?—Oh, yes; about 20 years ago I called on the miller under the Act of 1863, I think it is, to protect the salmon, and he was quite willing to do so, but he thought it was fair I should pay the expense; and as I was the owner of the fishery, and he was my tenant, and he helped me greatly to protect the fish, I agreed to pay the expense of the fry guards; and from that day this I have never had any trouble. I have had no complaints; he put them where he liked, where he thought it most convenient; and no injury has been done to the fishery, and no complaint has been made of the action of the fry guards.

3533. How long do you say these fry guards have been put up?—Over 20 years, I think.

3534. We have had a good deal of evidence about these guards; will you explain to the Committee exactly how these fry guards are placed and what they are?—I am afraid I cannot do that, because I have never seen the fry guards. I have not been in the country when they have been down.

3535. Are you quite satisfied that they form an ample protection to the fry?—Yes.

3536. Do they prevent the fry from going into the turbine?—Yes, from going into the turbine. There is a considerable fall there. I have been informed that it is about 38 feet on my side and

Mr. Seton-Karr—continued.

28 feet on the other side, so that any fry going down that fall would be smashed to pieces.

3537. Is that the fall in the mill race or the fall by the turbine wheel?—Down by the turbine wheel.

3538. The mill race runs quietly up to that point, does it?—Yes, and on my side it falls 38 feet.

3539. Then, owing to the existence of fry guards, there is no possibility of the fry getting into this fall at all?—No.

3540. Is there a bye-wash?—Yes.

3541. When is that opened; once a week?—Yes.

3542. And the fry or spent fish can go into the river, can they?—Yes, the fry or spent fish can go into the river.

3543. During the 20 years these turbines have been protected you never had any complaint from the miller as to the supply of water?—Never.

3544. Do you happen to know whether there are fry guards that are movable like window sashes, and can be replaced by clean ones?—I understand that is the principle.

3545. So far as you know, there is no difficulty in cleaning them, is there?—No. The miller takes great care to keep them free, and does it with very little trouble.

3546. Is yours an early or a late river?—A late river.

3547. Are the fry large?—A good size.

3548. They are larger than the last witness described, are they?—Yes, they are larger than in the Sligo fishery. I may say besides my fishery, there is a valuable coast fishery that the people living along the coast use. I believe that most of the fish that are got on the coast are bred in my river or the Sligo river.

3549. How many men do you think earn their livelihood or are dependent on the supply of fish from your river, roughly speaking?—I should think there must be 40 or 50.

3550. Is that including the coast?—Including the coast.

3551. It is not such a large fishery as the Sligo fishery, is it?—No.

3552. Do you think that if these fry guards were not there, your fishery would suffer much damage?—I think it would be destroyed.

3553. You have no doubt in your own mind the turbines would kill the fry?—I have no doubt whatever.

3554. Have you ever seen turbines at work?—Yes, I have seen them on my side of the river.

3555. Have you ever happened to be present when dead fry have been taken out?—I have never heard of any fry being injured there. I called on the miller at once to protect them, and he did it.

3556. What months in the year are these fry guards down?—Mine are down, I understand, in March, April, and May.

3557. Is it necessary to have any gratings at your head races or tail races?—I think they have gratings at the tail race.

3558. Is that to protect the salmon?—Yes, to protect the salmon going up.

3559. Are they always kept there?—Yes, I think they are permanent.

3560. Is there any difficulty raised by the mill-
owner?

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Colonel COOPER.

[Continued.]

Mr. Seton-Karr—continued.

owner with regard to them?—No, I have had no trouble.

3561. You do not happen to know, do you, exactly what kind of gratings they are?—No.

3562. Have you ever heard the slightest complaint?—No.

3563. You said just now that you paid for these fry guards; I suppose the cost was not very great, was it?—According to my recollection it was about 21 l. The miller said he would put them up as cheaply as he could, and he put them up by his own men; and I think the bill was 21 l.

3564. You had been on good terms with this miller, who was your tenant?—Quite so.

3565. Do you think it is fair that the fishery owner should be obliged to pay for the fry guard?—I think not. This turbine wheel is a very cheap motive power, increasing the power of the water very much, and if the miller takes advantage of that I think it is not very hard to call on him to protect the fish in the river.

3566. Particularly as the protection costs so little?—Yes.

3567. Do you think it was any cheaper with you than with regard to any other ordinary turbine wheel?—The miller said he would do it by his own men, and do it as cheaply as he could; and, perhaps, it was a little cheaper; but I should think 25 l. would cover the cost anywhere.

3568. I suppose it is not a question of expense so much to your mind, as of principle?—To my mind it is not a question of expense, but of principle.

3569. And supposing you did not get on with this miller, and he was not your tenant, and you had to go on to his land to put up the fry guards, it might lead to difficulty?—I am afraid it would lead to litigation and to lawsuits.

3570. I suppose it would mean that he and his men might break down the fry guards and you would have to replace them?—It might take that form, or he might bring an action for not keeping them perfectly clear. He might say there was great loss from the stoppage of the water, and that he ought to be indemnified from that.

3571. And the whole thing would turn on whether you happened to be on good terms with the miller, or not?—Yes. I may say that I recently renewed the leases of both my mills; and if I had known of this Bill in time I should certainly have inserted covenants in the leases that the millers should act as heretofore, and protect the fish.

3572. I suppose he would have had no objection to those covenants?—None whatever, I am sure.

3573. But you would have thought if only fair, and for your own protection, to have had that clause inserted, had you known of this proposed Bill?—Yes.

3574. But knowing nothing of it you did not do it?—I gave him a lease for 99 years, relying on the existing law.

3575. From that point of view do you think the present Bill would act most unjustly towards

Mr. Seton-Karr—continued.

you, and that it would be extremely unfair to introduce it under those circumstances?—I think so; it would be very hard on me, certainly.

3576. Is it impossible for the fry in your river to go down to the sea without passing down the mill race, and through the bye-wash?—I should think about three-fourths of the fry pass down the Collooney river, and the remaining fourth goes down a river where at present there are no turbine wheels.

3577. I suppose when the water is low most of the flow of the river goes down the mill race?—Almost entirely; and I may add that I allowed the miller to put a dam across the river last year so as to throw the water down one of his mill races, that was nearly dry in low water, that also supplies a turbine wheel. Of course I would not have allowed him to do that if I had known that this Bill was proposed.

3578. You were of course relying on the fact that the turbine was protected?—I was relying on the fact that he was protecting the fry, and that I should suffer no damage.

3579. And that the fry getting in the mill race would go down the bye-wash and be perfectly safe?—Yes.

3580. Have you studied the habits of salmon?—To some extent I have.

3581. Do you think it possible that fry on their way to the sea, getting into a mill race and going near the rush of the turbine wheel, would turn back and go up the race and down the river?—I do not think so.

3582. I suppose you place the strongest possible importance in the necessity of these fry guards in front of turbine wheel?—Certainly; for three to four months in the year I think it is absolutely necessary, and they are required at a time when there is very little weed or dirt in the river, or anything to stop the flow of the water.

3583. From your knowledge of the habits of salmon, do you think that fry when they are on their way to the sea with their silver coats on, are bound to go down the river?—Yes.

3584. Nothing will turn them back?—No.

3585. I believe it is the fact that the boards of conservators on whom this Bill proposed to throw the costs of protecting salmon have no funds?—No, they expend the whole of their funds; and Mr. Petrie and I have to subscribe largely to put on extra water keepers. We expend the whole of our funds in supplying water keepers.

3586. Will you give the Committee the figures of the expenditure and receipts of your water conservators; what do you spend in a year?—I am afraid I have not got the figures. I could easily have got them. I think the income is about 300 l. a year. We pay net licenses, and we have to pay 10 per cent. on the valuation of our fishery. Then Mr. Petrie and I have to supplement that by subscribing to the cost of putting on extra water keepers.

Mr. Macartney.

3587. I think 10 per cent. on the valuation of the fishery comes to 48 l., and the subscriptions amount to 175 l. 15 s., for the Sligo district. That is according to the return?—Yes.

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3588. The

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Colonel COOPER.

[Continued]

Mr. Macartney—continued.

3588. The total licenses amount to 125 £; so that the total was 348 £, and the balance in hand from 1888 was 148 £ 17 s. 11 d.; that comes to nearly 500 £.—Yes, I think it was between 500 £ and 600 £.

Mr. Seton-Karr.

3589. You spend a good deal more than you receive, do you not?—A good deal more.

Mr. Macartney.

3590. Are there any other accounts than I have in this return here?—No, I think not.

3591. According to this you have a balance of 240 £.—Is that so?

Mr. Seton-Karr.

3592. How is it that in this year 1890, that is so; there appears to have been a balance by this return of 240 £.—It is probable that that return is made at a time before the water keepers are paid.

3593. No, the water bailiffs are charged?—We certainly have not a shilling left after paying our men.

3594. You are generally on the wrong side, are you?—We just keep straight. We expend all we have in water keepers.

Mr. Macartney.

3595. Then you send up a balance; there it is in black and white?—May I ask what is the date of that return?

3596. There is a balance on the last report of 242 £ 18 s. 4 d. in favour of the board?—It turns on the payments. Our meeting is generally speaking in October, and we pay our men in the spring, in March.

3597. But that would not make any difference?—We have the return year after year sent to Parliament, and there is always a balance in your favour?—Because these accounts are furnished in October, and we have to keep a balance of 200 £ in our hands to pay water keepers in March.

3598. Then next year you have 200 £ in hand?—Because it is the same thing again.

Mr. Seton-Karr.

3599. You have just that amount in hand to pay the water bailiffs, and then carry the same amount forward every year at that particular period?—Yes. In March we have no money; then the license duties and the subscriptions, and all that, are paid in by October, when we furnish this account: which shows that we have in hand this 240 £ add to pay the 224 £ to the water bailiffs in the following March.

3600. Then to all intents and purposes you practically expend the whole of your income?—The whole of our income.

3601. And any extra costs thrown on your shoulders would have to come out of your own pockets, would it not?—Yes, out of our own pockets.

3602. You have always been on friendly terms with the millowners and lessees, I believe?—Always.

3603. Did you not allow one of them to throw a dam across the river?—Yes; I have said that

Mr. Seton-Karr—continued.

was to enable him to work his turbine on the left bank of the river.

3604. If you had known of this Bill you would never have allowed anything of that kind to be done without some special provision in your lease, would you?—Never.

3605. Do you think it would be a most risky thing if the boards of conservators as such had the responsibility of interfering with, or protecting the mills and machinery?—I think so. I think it is a very dangerous thing to touch a mill race. If it was not done by a very skilful person who understood it, you might do an immense deal of mischief.

3606. But there would be no difficulty for the millowners themselves who understood it?—They who understand it can do it without any trouble.

Mr. Toedinson.

3607. Have you a copy of your private Act of Parliament here?—I have not, here.

3608. Does it give you any greater rights in such matters as fish passes and other means of protection to the rivers than are contained in the ordinary law?—No, I think not.

3609. What powers does it give you?—It gave my uncle powers of buying up the rights of fishing in the Bay of Ballisodare.

3610. But no extra powers of constructing fish ladders or fish passes?—No; they were to be constructed of course on his property, which is now my property. I mean to say I own half the river, and it was to enable my uncle to buy the rights in the Bay of Ballisodare, and he was bound to construct the ladders on his own property.

3611. What sort of rights were they?—They were very vague, and worth nothing at all, or very little.

3612. Did you buy from the riparian owners?—Yes, and on the whole they did not cost very much. They cost altogether a good deal, but they were small sums. People had a little bit of bank, and claimed so much for the right of fishing; the salmon used to come into the bay; but they could not get up the river, and it was necessary to erect the ladders to create the fishery.

3613. Do you consider the present law as regards fish passes and fish ladders sufficient?—I think so.

3614. Are you aware that some of the witnesses have complained of the defects in the present law as to fish passes?—No, I was not aware of it.

3615. Do you know Mr. McDermott, who gave evidence here?—No, I think not.

3616. At all events you are satisfied, are you not?—I am satisfied.

3617. You spoke of the bye-wash being open sometimes?—Yes.

3618. There would be a very heavy rush down it, I presume?—There would be.

3619. Would that kill the fry?—I do not think so. Certainly the falls at Ballisodare and Collooney are very high, but somehow they get over it.

3620. These fish passes are not required for the fish going down, are they?—No.

3621. Has the average amount of water in the river diminished in your experience at all?—No, I do not think it has.

3622. Are you aware that evidence has been given with regard to some rivers where there has been

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Colonel COOPER.

[Continued.]

Mr. Tomlinson—continued.

been a diminution of water on account of drainage?—Yes, on account of drainage. I can quite understand it, but our rivers have not been drained.

3623. There has been no great amount of drainage near the source of your river?—No.

3624. Are the rivers polluted at all?—No.

3625. I suppose Mr. Petrie and you are on the same board of conservators?—Yes. There are two districts under the Sligo Board.

Mr. Macartney.

3626. Do you agree with the last witness that excepting where the conservators are fishery owners they are nonentities as public officials. I mean to say that they take no interest in protecting the salmon fisheries? The last witness said that except where they were fishery owners themselves they did nothing?—Several of our conservators have more interest in the coast fishing than in the rivers; nature brings the salmon along the coast, and they represent the people who catch them there. I do not think they go to much expense or trouble in protecting the fisheries. It is done by us, in fact. Mr. Petrie and I and Colonel Wood Martin, the owner of the Sligo fishery, protect the breeding as much as we can.

3627. You have told the Committee that you think it will be very hard on you if this Bill passes?—I think so.

3628. That it would in some way or other be injurious to your vested interest you say?—Yes.

3629. Have you read the Bill carefully?—Yes.

3630. Will you point out to me the clause which injures your fishery?—It takes the duties off the miller and puts them on to the board of conservators.

3631. What is the particular protection which you at present have in regard to which you say this Bill would injure you?—It would require the conservators, as I understand the Bill, to erect protections.

3632. But I understand you are quite satisfied with your position at the present time, are you not?—Yes.

3633. You are not being injured by anything? No, not under the present law.

3634. Will you point out to me the clause in the Bill which would cause you an injury?—The 3rd clause.

3635. What part of the 3rd clause?—It repeals the present law with regard to the section in the Act of 1863.

3636. And that you say would injure you, do you?—Certainly.

3637. What would be the effect of repealing that, do you imagine?—The effect of that would be that the boards of conservators, as I understand it, would have to protect the mill races.

3638. But how would repealing the 30th section affect you; what would it alter; your fishery is now protected by lattices and gratings, and you say that this turbine is inoperative, so far as any injury goes?—Yes.

3639. What effect would repealing the 30th section, as my Bill does, have upon you?—The miller would no longer put up the gratings.

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Mr. Macartney—continued.

3640. How; what right would he have; I think you are under a great mistake. Repealing the 30th section of the Act of 26 & 27 Vict., which is the Turbine Act, would simply leave the law in the position of the 5 & 6 Victoria Act; and you would be entitled to insist, and the Board of Conservators would be entitled to insist, on the miller in your case maintaining the lattices and gratings which are provided for in the 76th section of the 5 & 6 Victoria; because he could not show that it interfered with the effective working of his mill; and according to your evidence he can work it effectively. I want to point out to you that you are evidently under a misapprehension about the effect of this Bill, in your particular case. The Board of Conservators would be entitled or the Inspectors of Fisheries or the authority now existing would be entitled to oblige the millowner in your case to preserve his lattices and bars where he has them now, which would be amply sufficient to protect your fishing interests; and there would be no possibility of removing them, because he could not prove that they interfered with the effective working of his mill?—So far, that is an answer to my complaint at Collooney; but I also said there is a danger at Ballydare, now the lease has been renewed, that the miller will erect the turbine; and in that case I presume the section you refer to will not apply.

3641. He is not erecting turbines now, is he?—Not now.

3642. Is that the same class of mill?—Yes.

3643. Do you believe there is anything in the nature of the flow of water there which would enable a miller to show that, with a turbine working on the same river with the same force of water (and there is I believe an effective water supply), he could avoid putting up these lattices, when another miller has been working his mill effectively for 20 years? It would be rather difficult to prove, would it not?—It might be.

3644. He would have to prove it before judge and jury, and it would be very difficult, would it not?—Of course that would lead to a lawsuit.

3645. If you were able to call one of your own tenants who had been working two turbines for 20 years on the same river, and you could show, out of his own lips, that the ample protection to your fishery interests had not interfered with the effective working of his mill or turbine, it would be difficult for another miller on the same river with the same water supply to show that he could not work his turbine, would it not?—The river is totally different at the two places.

3646. In the amount of water coming down, do you mean?—Not so much in the water coming down, but in the circumstances of the mill races.

3647. The other portion of the 3rd clause in the Bill repeals Clause 76 in the 1869 Act which did away with exemption, does it not?—Yes.

3648. Do you think that would injure you in any way; the clause in the Act of 1869 did away with the power of exemption which existed under 5 & 6 Victoria there was power of exemption in cases where millowners could show that gratings or lattices interfered with the effective working

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Colonel COOPER.

[Continued.]

Mr. Macartney—continued.

working of their machinery; therefore it would come to precisely the same thing in your case, would it not, as with regard to the previous Act of 1843; you would still be protected by the Act of 5 & 6 Victoria?—Yes.

3649. Because under it the millowner would not be able to show, in your case, that he could not work?—Yes.

3650. So that as far as Clause 3 goes, if my Bill became law, in your particular case you would be protected?—Yes.

3651. Then we come to Clauses 4, 5, and 6, which are taken from the English Act; do you object to them because you think the expense ought not to be thrown on the board of conservators?—I think that is one thing; but I object also to the principle of relieving the millers of the responsibility of protecting their own mill races. I think more of the principle than I do of the expense; because, I think, the probability is, one could get the money.

3652. There would be no difficulty in getting money, you think?—In some cases no doubt there would be.

3653. It would be worth your while, would it not, to protect your fishery?—It would; but if the fishery belongs to several people who had only small interests in it, there might be difficulty in getting money to protect it.

3654. You said you thought it would be hard upon you if this Bill passed; do not you think it was rather hard, probably, upon millowners, who had invested capital in their mills, and who suddenly found this turbine clause sprung upon them?—No, I think they would derive such advantages from the invention of the turbine that it would be well worth their while.

3655. The conclusive evidence of the present moment from County Antrim is, that the turbines which are used there, and which are required for the peculiar purposes there, are absolutely stopped by the adoption of anything like that lattice?—Yes; I cannot understand that from my knowledge of turbines on my river.

3656. I quite admit you have given a case to the Committee where there is a totally different sort of turbine of a different character, and the work these are required to do is very different; do not you think it would be rather hard upon the millowners who had invested capital and suddenly found this turbine clause sprung upon them?—But surely the turbine clause is an 1843 clause?

3657. Yes, but there were turbines before then?—But it must be something subsequent, must it not. Have they found out the grievance only now?

3658. From 1863 to 1869 we have it in evidence that there was no attempt made in the North of Ireland to put the turbine clause in force by any board of conservators?—I was not aware of that.

3659. Do not you think they would feel very much like you, that not being aware of it it is rather hard upon them?—It may be, under those circumstances; but did not they do any mischief between 1863 and 1869?

3660. Apparently the Boards of Conservators did not think it was material; they took no steps, at all events, till 1869, either in the north

Mr. Macartney—continued.

or any other portion of Ireland, that we are aware of?—I at once feared, and fully expected injury to the fishery from the construction of the machine, and I put the clause in force at once.

3661. The property which you have in this fishery was created about 50 years ago by special Act of Parliament, you say?—Yes.

3662. I suppose the capital that was invested in carrying that Act, and buying up the rights that may have existed there, has been very productively employed?—Yes.

3663. I am not going to ask you any details?—Yes, it has been; it is a valuable property.

3664. Would you have any objection to tell the Committee (I am not asking you as to your profits) what is the annual value of the fish that you dispose of; have you any objection to saying that?—The poor law valuation is 500 £ a year.

3665. Have you any objection to tell me the annual value of the fish; you need not answer the question unless you wish?—I think I would rather not.

3666. You would rather not lay before the Committee the amount that you receive for the fish; I am not going into the details of the question, but the total amount you would rather not say?—I would rather not say.

3667. And the valuation you say is 500 £ a year?—Yes, 500 £ a year.

3668. Your contribution, by law, to the protection of your salmon fishery, is 10 per cent.; that is all that the Board of Conservators can call upon you for, is it not?—Yes.

3669. You are obliged by law to pay that?—That is all I am obliged to pay by law, and the net licences.

Mr. CAR.

3670. Ten per cent. on the valuation?—Ten per cent. on the valuation.

Mr. Macartney.

3671. I find that 43 £ was the value received by the Sligo Conservancy Board last year and the year before; that is the whole contribution by the salmon fishery owners to the protection of their industry by law, is it not?—Is that so?

3672. These turbines have been working about 25 years, I think you said?—I should say very nearly 25 years. Supposing this section is repealed, I understand that the millowner will no longer be responsible for maintaining the fish gratings.

3673. The law will be exactly as it was under 5 & 6 Victoria?—Whose duty was it to maintain them under that Act?

3674. The 78th section provides: "There shall be placed and fixed by the occupier of such water-courses, cuts, channels, or sluices at their points of divergence," &c. It would leave that Act exactly as it was?—Yes, that the millowner should keep it in order and maintain it.

3675. And the gratings and wire lattices?—Yes.

3676. So that you would have both those, provided that the effective working of the mill was not interfered with?—But to make any change it would be necessary for him to prove that it had changed

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[Continued.]

Mr. Macartney—continued.

changed since your Bill passed into law, and as it has been working for 25 years with the wire gratings, of course it would be difficult.

Mr. Seton-Karr.

3677. What I understand you strongly object to in regard to this Bill is that the Bill by the repealing Clause 3, and by Clause 4 takes the whole responsibility off the shoulders of the millowners, and throws the whole burden upon the shoulders of the conservators, of protecting machinery?—Yes.

3678. That is your main objection?—That is my main objection.

3679. I suppose also you recognise that besides the conservators having no funds to put these fry guards, there is also no one established as a judge who shall say whether the guards interfere with the effective working of the mill or not?—There is nothing but a lawsuit I am afraid.

3680. And that involves expense?—That involves a judge and jury, and expense.

3681. Then it takes away the safeguards you now have, and it establishes others which you do not think satisfactory?—Not satisfactory.

Mr. Macartney.

3682. Then in your opinion the law from 1842 to 1863 was in an unsatisfactory condition?—I think so, if there were many turbines at that time, but I do not think there were so long ago as that. Certainly in my country it is quite within recent years that they have been put up.

3683. And you are not prepared as a salmon fishery owner to go before a judge or jury upon the protection of your rights?—I dislike a lawsuit, and I do not think I am peculiar in that as a salmon owner.

3684. Is that the only reason?—Yes, that is the only reason.

3685. You do not object to the tribunal otherwise, except that you do not like a lawsuit?—I do not like a lawsuit.

3686. At the present moment you say the inspectors of fisheries are the sole judges of what is or is not sufficient protection to the millowner?—Yes.

3687. Would you have any objection to having the inspector of factories substituted for him?—I should like rather more a joint tribunal probably; that the Fishery Commissioner should be represented.

3688. With the factory?—With the factory inspector.

Mr. Seton-Karr.

3689. Mr. Macartney asked you whether you had suffered any injury or injustice whatever under the law as it now stands; I suppose the reason why you have had no trouble, and everything has gone on satisfactorily, is owing to the fact that you and the millowners have always been excellent friends?—Yes.

3690. And in your own case, at all events, they have been your tenants?—Yes.

3691. In more than one instance?—Two of the principal millowners are my tenants.

3692. Supposing Mr. Macartney's Bill passed, while the relation between you and the millowners continued the same, you say there might be no difficulty?—There might be no difficulty.

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Mr. Seton-Karr—continued.

3693. But in the event of strained relations between you and your opponents, or between you and the millowners, then difficulty might arise?—Yes; I should be afraid of, perhaps, a limited company taking the place of the millowners, and in that case it would be difficult to work so well with the manager as you can with the lessee of a fishery.

3694. The whole thing, then, would turn upon the relations between yourselves and the millowners?—Yes.

Mr. Tomlinson.

3695. Is there any poaching in your river?—Yes, a certain amount.

3696. Does it seriously affect the amount of fish?—No, I think not. There is a certain amount of poaching in the winter. I keep a very strong body of men to protect the most important streams, and occasionally they are caught and we have some little trouble.

Mr. Macartney.

3697. I see the subscriptions to the Sligo Conservancy Board for 1889 amount to 175 £. 15 s.?—Yes.

3698. That comes, I suppose, from the salmon fishery owners?—Yes.

3699. Then it fell off in the next year to 86 £.?—I do not know that. My subscription was the same. I subscribed the same amount both years. It is possible that there might be some difference in the Sligo district.

3700. What is your subscription?—It is about 80 £ a year.

3701. So that as the amount here is 86 £, practically you were the only subscriber?—I suppose at the time of the sitting of the board I was the only person who had paid in the subscription. If we want one or two more men put on, then I pay rather more money. It just depends on what number of men are required.

Chairman.

3702. Are the conservators the only persons who preserve these rivers, or do the owners themselves preserve them. As I understand it, the conservators preserve the river and prevent poaching?—Yes.

3703. Do the private owners not preserve the river also?—Yes, they help. All the riparian owners help, so far as they can. They lend their assistance.

3704. Do not you yourself keep up a staff of bailiffs to look after the river independently of the conservators?—Practically I do by means of that subscription, but they are appointed by the conservators. My men are appointed by the conservators, because it gives them power, and it gives them a better position acting under the board than if they acted under me privately.

3705. Then, if what they now receive was not sufficient to preserve the river, would you increase your subscription?—Yes, if I thought there was likely to be poaching on any stream, I would put on one or two more men. I would probably recommend the board to put them on, and guarantee their expenses.

3706. Then, in point of fact, the preservation of the river falls upon the fishery owner?—Yes.

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3707. If

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[Continued.]

Chairman—continued.

3707. If it is more than the conservators receive, the fishery owner has to make it up?—Yes.

Mr. Macartney.

3708. Beyond the 10 per cent. upon your fishery which you pay to the board, and beyond your proportion of the subscriptions, you incur no costs in the protection of the fishery, do you; it would all appear here?—It all appears there.

3709. You do not disburse any other money than what is disbursed in your subscription to the protection of the fishery?—No.

Mr. R. L. MOORE, called in; and Examined.

Mr. Seton-Karr.

3711. You are a Conservator of the Ballyshannon, Londonderry, and Coleraine districts of fisheries?—Yes, I am. I am also managing partner of the Foyle, the Bann, and the Erne.

3712. How long have you been connected with the fisheries?—Since 1894.

3713. Will you explain to the Committee how the conservators are appointed?—There are three classes of conservators. There are first magistrates who pay license duty and own land shuttling on the stream frequented by salmon. Then there are four conservators in the Bann elected for the upper division and four for the lower division; the same in Londonderry, and I think six in Ballyshannon for each division.

3714. How are these four that you speak of elected?—The four are elected according to the amount of license duty they pay. Those for upper division are elected by those paying license in the upper or freshwater portion. Those in the lower by those paying license in lower or saltwater division.

3715. Then there are three classes of conservators, if I understand you right?—Yes.

3716. First, the magistrates who pay license duty and who own land shuttling on a river frequented by salmon?—Yes.

3717. Secondly, the owners of fisheries valued at 100*l.* per annum?—Yes, but only one case represents a fishery valued at 100*l.* per annum.

3718. And thirdly, four who are elected for the lower, and four for the upper division, elected by fishermen who fish under common law rights, and also by anglers and net fishermen?—Yes, that is so.

3719. Those are the three classes of conservators?—Yes.

3720. I believe you have a map showing the catchment area of all the salmon rivers in Ireland?—Yes, here is a map showing the catchment area of all the rivers in Ireland and marking them out. From it you will see that nearly every river in Ireland is a salmon stream. This is the drainage area of the Erne. It empties in Donegal Bay. This is the drainage area of the Bann which empties here, and the Foyle empties here.

3721. The Bann and the Foyle empty nearly in the same bay?—Yes.

Mr. Tomlinson.

3722. In fact you take in all those three drainage areas?—Yes.

Mr. Cox.

3710. I understand Mr. Petrie to say that you brought in a good deal of salmon ova, and encouraged it in that way?—I incur many other expenses of course. I understood Mr. Macartney to be asking with regard to the fishery. I may say that in the last 10 years I have hatched a good many with the greatest possible benefit to the fishery. I have got ova from the Rhine and neighbouring rivers. Of course this involves considerably expense. But as to the protection of the fishery, it all appears in those accounts.

Mr. Seton-Karr.

3723. That is the whole of your district that you are referring to?—Yes.

3724. And over which you are the manager?—Yes.

3725. Is the catchment area of the Sligo fishery shown?—Yes. This is it (*explaining map*).

3726. What is the area of the Foyle in square miles?—The area of the Foyle is 1,392 square miles.

3727. And of the Bann?—2,240 square miles.

3728. And the Erne?—1,688 square miles.

3729. Perhaps you will tell the Committee the number of miles in each of those three rivers available for salmon breeding?—In the Foyle 350; in the Erne 200; in the Bann 100.

Mr. Macartney.

3730. Including tributaries?—Yes, including tributaries.

Mr. Seton-Karr.

3731. Had the Bann a longer length of breeding line at one time?—Yes; it was double that.

3732. How has it been reduced?—It has been reduced by mill dams, turbine wheels, and other motors, and by poisonous matter.

3733. From mills and factories?—Yes.

3734. We have had reference from one or two of the other witnesses to the Six-Mile Water?—The Six-Mile Water was formerly a very good breeding stream. It is now completely deserted by salmon. They do not enter it at all, and I think it is about 16 miles long. There are eight turbines in it.

3735. What part do you think the turbines have played in exterminating the salmon there?—I have not the least doubt that they have killed the fry.

3736. I suppose the pollution of the river has also had something to do with it?—Yes; it is not so polluted as it was, though.

3737. But you think that the turbines, at all events, had a great share in destroying the salmon in the Six-Mile Water?—Yes.

3738. You know the Six-Mile Water of your own knowledge?—Yes; not very intimately. I know it pretty well. I have been over it two or three times.

3739. And you know the turbines that are on it?—I do not know that I could give you the names of them.

3740. You

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Mr. MOORE.

[Continued.]

Mr. Seton-Karr—continued.

3740. You know there are eight turbines on the river?—There are I know eight turbines on it.

3741. How long have they been on the Six-Mile Water?—That I could not answer.

3742. You do not know how old they are?—Most of these turbines have been erected in the last few years.

3743. Now, with regard to the income of the board of conservators in your district, and the expenditure, you are aware that by this Bill it is proposed to throw the expense of protecting turbines on the shoulders of the conservators; I want you to show the Committee what funds they have at their disposal?—The income of the Coleraine district in 1890 was 1,021 *l.* 11 *s.* 2 *d.*, and the expenditure was 989 *l.* 16 *s.*

3744. So that they had a balance of about 40 *l.*?—Yes, about that. The income of the Londonderry district was 638 *l.* 3 *s.* 3 *d.*, and the expenditure 1,254 *l.* 11 *s.* 8 *d.*

3745. In other words, there was a deficit there of how much?—£. 596. 8 *s.* 5 *d.*

3746. Would that come out of the pockets of the conservators?—No, it was paid by the lessees of the fishery.

3747. It would come out of the pockets of the lessees of the fishery?—Yes, they supplement the funds of the conservators by so much.

3748. They had to make up that amount?—Yes.

Chairman.

3749. And did they get the balance in the other case?—No; in Coleraine they did not.

Mr. Seton-Karr.

3750. The Board of Conservators retain the balance, I suppose?—Yes.

3751. Now, with regard to the Ballyshannon?—The income of the Ballyshannon district was 430 *l.* 1 *s.* 2 *d.*, and the expenditure was 664 *l.* 4 *s.* 6 *d.*

3752. There was a deficit there of over 200 *l.*?—There was a deficit of 234 *l.* 3 *s.* 4 *d.*

3753. That, again, the lessees of the fisheries had to find out of their own pockets?—Certainly.

3754. Why do you take that year 1890?—It is the last report.

3755. It was not a particularly expensive year?—I take it because it was the last report I have had; it is generally about the same.

3756. It means that the Board of Conservators, through the lessees of the fisheries, spend a good deal more money than they get in subscriptions?—Yes.

Mr. Macartney.

3757. That is a different account to that supplied to the inspectors of fisheries?—I think not. Erne fisheries gave besides the 236 *l.* 12 *s.* 6 *d.* in August, and besides 30 *l.* 10 *s.* in the previous February, when there was a deficit. This makes up the 276 *l.* 2 *s.* 6 *d.*, as stated in Report, 1890.

Mr. Seton-Karr.

3758. You say the deficit was made up by subscriptions from the lessees of the fisheries?—The lessees of the fisheries of the Erne gave 267 *l.* 2 *s.* 6 *d.* to the Ballyshannon Board, and 0.80.

Mr. Seton-Karr—continued.

the other proprietors on the Erne subscribed 59 *l.* 10 *s.*

3759. Was that to the Ballyshannon Board also?—To the Ballyshannon Board.

3760. Is there any more money spent on protection besides what you have mentioned?—Yes. In the Londonderry district the lessees spent, during the annual and weekly close seasons of 1890, 700 *l.*, and in Coleraine there was 240 *l.* spent, and in Ballyshannon 170 *l.*

3761. Do not these sums appear in the accounts you have given?—No, they do not appear in that account at all, because there are a number of these men who have not passed through the conservators' books. They are in the employment of the lessees and of the owners about a fourth of the year. I mean to say they are fishing, and during the rest of the year they are employed for protection.

3762. Then it comes to this, that these moneys are not included at all in the account?—No, they are not included in the accounts at all. You will see from this that the cost to the lessees in Londonderry district is 1,255 *l.*, in Coleraine 240 *l.*, and in Ballyshannon 437 *l.* 2 *s.* 6 *d.* over and above in these districts the license duty or licensee duty, and 10 per cent. on valuation.

3763. That is for the protection of the whole of the Derry district?—That is the Derry district. The license duty in the Londonderry district is 150 *l.*, and 85 *l.* more is paid to bring it up to the 10 per cent. on valuation, which is 2,405 *l.*

Mr. Macartney.

3764. Rod license?—No, not rod licenses; all the licenses.

3765. It is down here as 348 *l.* in the Derry district for license duty?—I am taking what the lessees have paid.

3766. I thought you meant what the Board received?—No. I have already stated, I think, what the Board received. The income of the Londonderry Board is 638 *l.* 3 *s.* 3 *d.*

Mr. Seton-Karr.

3767. And they expended about 300 *l.* or 400 *l.* over that?—They expended nearly 600 *l.*

Mr. Macartney.

3768. These amounts make it 1,218 *l.* a year?—It comes very near to the same thing. The expenditure is 1,234 *l.* 11 *s.* 8 *d.* But then the license duty on the Foyle is about 150 *l.*, and 10 per cent. on the valuation is 95 *l.*

Mr. Seton-Karr.

3769. These sums you have mentioned, 1,255 *l.*, and 150 *l.* and 95 *l.*, are the sums which you say the lessees pay?—The sums that the law compels you to pay are 150 *l.* and 95 *l.*; 95 *l.* is the valuation.

3770. Then the law, I understood, compels you to pay 150 *l.* and 95 *l.*?—Quite so.

3771. Besides that they pay 1,255 *l.*?—Yes, that is the cost.

3772. For the protection of the Derry fishery?—For the protection of the Derry fishery.

3773. A great deal of which comes out of their own pockets?—The 1,255 *l.* comes out of their pockets.

3774. The whole of it?—Yes, the whole of it.

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3775 The

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Mr. MOORE.

[Continued.]

Mr. Macartney.

3775. The pockets of whom?—

Mr. Seton-Karr.

3776. Of the lessees?—Yes, of the lessees. The conservators in the Londonderry district have an income of £58 l. 3 s. 3 d.

Mr. Macartney.

3777. For what year, because that total disagrees with the last two reports? It makes it double the amount furnished here to Parliament by the Inspectors of Fisheries?—I took those figures out of the 1890 Report.

Mr. Seton-Karr.

3778. When you speak of the Derry district, you mean all three districts?—Not at all; the Londonderry district simply. The income of the Londonderry district was £58 l. 3 s. 6 d.

Mr. Macartney.

3779. Here it is 1,261 l.?—Yes, because there was a subscription given of 595 l. 8 s. 5 d.

Mr. Seton-Karr.

3780. Without confusing the Committee by going into small details of figures, the evidence you give amounts to this, that in these districts the lessees pay practically very much in excess of the funds provided by the boards of conservators?—Yes, certainly.

3781. The printed returns apparently show that you carry forward a balance of 182 l. 4 s. 7 d., and you began with a balance on the year before of 203 l., a loss of about 40 l. Now your evidence is that the loss or additional expense, which comes out of the pockets of the lessees, is very largely in excess of that amount?—Yes.

3782. By "subscriptions," you mean voluntary subscriptions?—Voluntary subscriptions.

3783. Given by the lessees?—Yes.

Chairman.

3784. What I understand is that we have here the income of the commissioners or the conservators and their expenditure, and the difference between them is made up by the lessees?—Yes.

3785. And in addition to that you say that as regards Coleraine, 700 l. was spent by the lessees?—£. 700 in the Londonderry district, and 240 l. in the Coleraine district, and in Ballyshannon, 170 l. That makes a total in the Londonderry district of 1,245 l. over and above the 150 l. license duty, and 95 l. paid on the 10 per cent. valuation. The Coleraine district gives 240 l. in addition to the license duty of 55 l., and 10 per cent. valuation, 95 l.

3786. That was part of the subscriptions which were included in the income of the conservators?—Quite so.

3787. What you wish to impress upon us is that your liability was very small under the law, but your expenditure in order to maintain the fishery was very much larger?—Yes, that is so. The Ballyshannon district costs 457 l. 2 s. 6 d., and the license duty, 108 l. The license duty in Ballyshannon covers the 10 per cent. valuation.

Mr. Seton-Karr.

3788. While we are on that point it is quite clear, and I need hardly ask you that if any ad-

Mr. Seton-Karr.—continued.

ditional expenditure was thrown upon the Board of Conservators it would have to come out of the pockets of the lessees?—Yes, certainly. They have no funds.

3789. Absolutely no funds?—No.

3790. On the other hand they are always largely out of pocket?—Yes.

3791. Now, with regard to the question of the fishing industry in your district; how many boats are there on the coast from Ballyshannon to Portrush engaged in the salmon fishery?—Along the coast and in these three districts, in fact there are four districts, because there is the Letterkenny district in it too, from Portrush to Ballyshannon there are 160 boats employed.

3792. Are they practically dependent on the supply of salmon from the rivers in your district?—Certainly. It is the large rivers that produce the salmon. I should add that there are a number of boats that do not appear in that at all, boats fishing with sea-nets which fish for herring and other fish. Last year they took 3,000 l. worth of fish that do not appear in that at all.

3793. That is outside?—Yes, it is in Donegal Bay.

3794. That is in addition to the 160 boats?—Yes.

Mr. Carr.

3795. The 160 boats are all salmon boats?—All salmon boats.

Mr. Seton-Karr.

3796. How many men in each boat?—Five to six men in each boat.

3797. Fishing under common law rights?—Under common law rights. Then besides that the boats are generally held in shares. There is generally a share for the boats and a share for the net, and these are generally held by different people, so that it comes out to about 1,000 men.

3798. What is the coast range?—From Portrush to Ballyshannon.

3799. What is the distance, roughly?—I could not tell you; I could not even approximate to it.

3800. Practically, the coast fishery alone, dependent on the rivers in your district, gives employment to nearly 1,000 men?—Quite so.

3801. Has it increased during the last 20 years?—Yes; about 20 years ago I do not think there were any boats.

3802. What is the reason?—Drift nets were quite unknown off our coasts.

3803. The increase is due to drift nets?—

Mr. Macartney.

3804. Do you say that these 160 boats are entirely engaged in drift-net fishing?—Not entirely drift-net fishing.

Mr. Seton-Karr.

3805. The majority of them are drift nets?—Yes; off the Foyle there are now between 70 and 80 drift nets every year.

3806. Besides those men that are employed in the coast fishery, could you give the Committee some idea of the men that are employed inland on the rivers?—Do you mean watching in the season?

3807. Yes;

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Mr. MOORE.

[Continued.]

Mr. *Seán Kerr*—continued.

3807. Yes; could you give us any idea?—I could, but I have not taken that out; I should think there were between 200 and 300 on the Foyle alone; I could not give you that.

3808. Do you think it would be over the mark to say that taking the whole fishery in dispute in your district it gives employment to something like 2,000 men?—Certainly it does; I am quite sure.

3809. It would not be over the mark to say that?—No, I think not.

3810. It might be more?—I am sure it gives employment to 2,000 men.

3811. To at least 2,000 men?—Yes, I am quite sure of that.

Mr. *Macartney*.

3812. That includes the 1,000 at sea in open boats?—Yes; that is including the men in open boats, the protectors of the river, and men employed in the fishery.

Mr. *Seán Kerr*.

3813. It might be nearer 3,000 than 2,000, taking the whole?—I do not know; I am quite sure it is within the mark when I say 2,000.

3814. I think you are prepared to tell the Committee that there are something like 70 or 80 boats off the mouth of the Foyle alone?—Yes; 70 or 80 boats, fishing drift nets off the Foyle.

3815. Now, with regard to the mills; do you know many of the mills on the Banuf?—Yes, I know a good many of them.

3816. Have you visited any of them?—Yes, I visited them last autumn.

3817. With whom?—With Mr. Hassard, civil engineer.

3818. In what state did you find them with regard to the protection of fry?—Some of them were protected. They had not fry-guards up then, because it was not necessary, but I saw the fry-guards lying there, but a few of them were protected. Mr. Giehons' mill I think it was, was thoroughly protected from the fry entering into it. That was a protection which he put up to protect his own turbine wheel.

3819. What kind of wheel is that?—Is it a macadam turbine.

3820. Is it a flour mill?—No, it is bleaching, I think.

3821. He had a modern turbine there?—No, it was a macadam turbine.

3822. That is not of the newest kind?—No, I think not.

3823. Is it of an old-fashioned kind?—Yes.

3824. Was that the mill of which we have already had evidence with a perforated iron plate?—I think so. There were also two of these mills which had half-inch gratings on them.

3825. Which mills were those?—Mr. Giehons and Messrs. Frazer and Mr. Haugson I think were two.

3826. Were they bleaching mills worked by turbines?—I am not very clear.

3827. Were they worked by turbines?—Certainly.

3828. But you are not quite sure what kind of mills they were?—I am not quite sure what kind of mills they were.

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Mr. *Seán Kerr*—continued.

3829. Were they adequately protected?—Not from fry. They had half-inch gratings, but that half-inch would be more difficult to keep clear after the autumn, when the leaves are descending, than three eighths openings would be in the spring, when there was no dirt at all.

3830. Generally speaking, do you as a fishery owner complain of the state in which these mills were with regard to the protection of the fry?—Certainly. As far as I saw them at that time of the year, there was no protection for fry on them at all except at Mr. Giehons, I think.

3831. It was not required at that time of the year?—No.

3832. But at the right time of the year, in April, May, and June, these mills were not, in your opinion, adequately protected?—No, certainly not; not when the fry were descending.

3833. Then, at the present moment, the law is not being regarded there?—I believe not. I have not been over it myself this spring.

3834. The inspectors have used their powers of exemption very largely?—Very largely.

3835. Do you think those mills are doing very much injury to the salmon?—I have no doubt that the turbines are doing great injury; I have not the least doubt about it.

3836. You think they are doing a large injury to the fish?—I have not the least doubt about it.

3837. You visited Mr. Webb's mill, I believe, did you not?—Yes.

3838. What are the gratings in front of that?—1½-inch.

3839. That was no good whatever for keeping fry out?—Not for fry; no.

3840. Do you know the circumstances under which Mr. Webb was prosecuted? I believe by the order of the conservators?—Yes.

3841. We have had evidence of that?—Yes.

3842. I do not think it is necessary for you to repeat it; you have read the evidence of the former witnesses I believe?—Yes.

3843. Is there any point with regard to the circumstances of that prosecution which has not been men-tioned, but which you would wish to mention to the Committee?—Not that I remember. I do not know whether it has been called to the attention of the Committee here or not, that the first steps taken were in 1885. The first notice was given in 1885, when the conservators found that turbines were being substituted for bucket wells. Then those who had turbines were served with written notice in 1889, and in 1890 the inspectors of Irish fisheries having brought under notice the great decrease in the salmon, issued this notice which I hand in.

3844. That was in 1889?—In 1889.

3845. I suppose the fact that the notice was not issued till 1889, and that proceedings were not taken until quite recently, was owing to the fact that the turbines had only recently been erected, and that the conservators had only recently discovered that they had done so much injury to the fish?—Yes. Most of these turbines, I believe, have been erected within the last 12 years.

3846. And they have been very largely multiplied during the last five years, have they not?

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—Most

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—Most of them. I think, have been erected within the last six years.

3847. It was not until they became so numerous and the destruction became so apparent that very active proceedings were taken?—Certainly.

3848. But they began in 1883?—The mill-owners had been treated most leniently for no proceedings had been taken against them, I think, until last year.

3849. They have never been harassed in any way?—Not at all.

3850. It was only when the conservators or lessees were driven to take steps to protect their own interests that proceedings were taken?—That is so.

3851. Now with regard to the nature of these fry guards, you are a practical man and have been connected with this fish industry for a great many years, and you have seen these mills yourself; would you very shortly explain to the Committee in what way you think fry guards could be put up so as not to interfere with the working of a mill?—I would rather not do that because there will be expert evidence produced before you here which will prove as far as it can that they are perfectly compatible, and there will be expert evidence produced here that turbines work under protection without any interference in the slightest degree.

3852. You would rather leave that then to the expert evidence?—I think it would be better for me to do so.

3853. Have you in your own mind any doubt as to whether the salmon industry and the mill industry are compatible or not?—I am quite sure they could live side by side.

3854. You think there is no doubt whatever that such fry guards could be put up as would not interfere with the working of a mill?—I should think not. I do not understand that fry guard which is now in this room. It seems to me that in that fry guard there ought to have been a bar across the top, for it always rises to the top.

3855. Can you explain why that has not been done?—No, I do not understand that fry guard at all. I saw a good many fry guards, but I saw none like that.

3856. That is like no fry guard you have ever seen?—No.

3857. It is quite unusual to have a fry guard so stopped up?—Quite so. I saw fry guards at nearly all those mills.

3858. It is only during three months in the spring when you require your fry to be protected?—It is only during March, April, May, or April, May, June, either the one or the other, that you require protection.

3859. That is all you ask for?—Yes, that is all that is necessary.

3860. Do you attach much importance to gratings at the tail races?—In some mills. In some mills I believe it is not necessary at all.

3861. It depends upon whether the river and the mill races are so situated that the salmon run up the tail races?—If it is a regular leap, they will run up the tail races.

3862. While we are on the question of these turbines with fry guards, do you know of your

Mr. Seton-Karr—continued.

own knowledge of salmon fry having been killed in turbines?—Yes, one of our employes who gave evidence here, Mr. Macdermott made, some fry experiments on Thursday last. He passed 32 fry through a turbine with a fall of, I think, about 16 feet, and there were only six which came out alive.

Mr. Macartney.

3863. What sort of a turbine was it?—Herules.

Mr. Seton-Karr.

3864. That is a modern turbine, is it?—It is just put up.

3865. Where?—It is near Derry.

3866. And you have had information from him of the results of this experiment?—Yes.

3867. When did you say it took place?—On Thursday last, and he says that he believes those six would also have been killed, except that they came at the latter part; that there was a trickle of water came through the turbine after it was stopped.

3868. And that they came with that trickle of water?—Quite so he thinks.

3869. Were they injured at all or were they all right?—No, those six did not seem very badly injured.

3870. They might have been injured a little?—He does not say that. He thinks they came through this trickle of water.

3871. But the large majority of the fry were killed?—Yes, certainly. Some of them were injured to pieces. He had to strain them through his hand in little pieces.

3872. You have listened to a good deal of the evidence before this Committee; you have heard the evidence of Mr. Webb and others?—Yes.

3873. Witnesses have told us that they do not think the turbines did any injury to the fry; do you agree with that?—Certainly not. I do not believe it is possible with $\frac{1}{2}$ inch, which is the distance between the turbine and the casing anything could pass through alive. You will have expert evidence brought before you on that point.

3874. You, as a practical man, do not believe it is possible that the fry can go through turbines alive?—No, certainly not. With regard to Mr. Webb, if you take the same proportion of fry as passed through this turbine on Thursday last, you will have no fry at all when you come to Mr. Webb's turbine. So it is not much wonder that Mr. Webb's man could not see fry coming down there.

3875. You mean they would all be killed before they came there?—Yes. There were other turbines above.

3876. And there would be none alive by the time they got there?—By the time they came to Mr. Webb there would be none. The only fry that could come through Mr. Webb's turbine would be those bred in the immediate vicinity, and there are none hardly.

3877. I understand your point is this: that Mr. Webb's turbine being situated below two or three other turbines, when he says that no fry were injured by his turbine it practically amounts

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amounts in this that no fry ever get down as far as his turbine?—Very few.

3878. They are all killed by the other turbines above his before they get there?—Yes; I believe there are very few.

3879. Under any circumstances you do not believe for a moment that fry could possibly go through that turbine without being injured or killed?—I should think not.

3880. You have read Mr. Macartney's Bill?—Yes; I have.

3881. Who do you think should be at the cost of putting up protection?—I think the mill-owners decidedly. The fish all preceded the mill-owner, and if there is any right in the water at all the fisheries ought to have more right than the millowner. Besides that, the millowners are taking 25 to 40 per cent. more power out of the water than they formerly were doing, and they are putting up most destructive engines. Therefore, I think, in common justice the millowner should not put in an engine to destroy property without properly protecting.

3882. You object, I suppose, chiefly, or to a very great extent, to this Bill on the ground that it throws on the board of conservators the expense of putting up any fry guards?—Certainly. I think I have already shown you the board of conservators have really no faults.

3883. When you say that you think the mill-owners should put up these fry guards, the question of expense is not present to your mind so much as the question of principle?—It is not altogether a question of expense. I believe they can be put up in a very inexpensive way.

3884. The question of expense is a small one, and hardly enters into consideration at all?—Well, if it were thrown on the conservators in the Bann district, there is an enormous number of millowners in that district, and they could not attempt it.

3885. It might be very serious there?—Yes.

3886. But to each particular millowner the expense would not be great?—No, it would not. At least, so I am informed; you will have that proved.

3887. I suppose that you, as a fishery owner, would find great difficulty on entering on the landowners to put up these fry guards?—There is no power that I can see to enter upon the lands at all.

3888. Then you would be at the mercy of the millowners with regard to the maintenance of these guards?—Certainly, and the millowner can also protect his guard, whereas the conservators could not in any way protect them, nor could the conservators keep them clean. They would have to keep men employed there continuously to do it.

3889. With regard to the decrease of the salmon in the Bann, have they decreased much during the last six or 12 years?—Comparing the last six with the previous six years, the salmon in the Bann have decreased exactly one-half.

3890. And that, practically, is co-incident with the erection of turbines?—Quite so; it is co-incident with the erection of turbines.

3891. In other words, it is fairly reasonable to suppose that this decrease is largely due to the erection of turbines?—So I should think.

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Mr. Seton-Karr—continued.

3892. That is your belief, at all events?—Yes, that is what I believe.

3893. Supposing the present state of things goes on in the Bann, and that the millowners are allowed to run their turbines without protecting them, what do you think will happen to the salmon industry?—The salmon will be decimated. There will be no salmon in the Bann at all.

3894. I suppose coupled with these fry guards it is necessary to have a bye-wash and a sluice?—Yes, I should think there should be a bye-wash at every mile to let the fry escape.

3895. That practically is all you want, namely, fish and fry guards coupled with a sluice at a bye-wash to take them down when the mill is stopped running?—The bye-wash should be open when the mill is not working.

3896. And if that is not done, you think it will entirely ruin your fishery?—Yes.

3897. And throw all these men to whom you have alluded out of employment?—Certainly, of course it will throw a number of them out of employment if you take away their means of livelihood. It would be the same all over Ireland.

3898. Mr. Webb has given us certain reasons why, in his opinion, he thinks the supply of fish has been decreased. I think he stated, in the first place, there were improved appliances for capture at Coleraine and at other places; secondly, there was more poaching; thirdly, increase of flax water, and fourthly, the conservators did not build fish passes; did you hear that?—Yes, I heard that. First as regards the different method of capture at Coleraine, I say the method has not altered since the year 1864. The means of capture are exactly the same now as they were then. Indeed, the method of capture has really not altered, I believe, very much since Henry II.'s time.

3899. You deny the validity of the first reason, then?—Yes, certainly. The means of capture are not better at Coleraine. There used formerly to be a net stretched across at Coleraine, which always remained in position, and that net is not there now.

3900. How long ago was that?—It was before my time.

3901. That was in olden times?—Yes, the whole river was stopped; the fish could not get up at all.

3902. Now, what do you say as to the second reason, the poaching?—The poaching now is a great deal less than it was; the population on the streams has greatly lessened.

3903. How is that?—Emigration and the migration into towns.

3904. The general decrease of the Irish population?—Yes; then as to flax water; the flax water is neither better nor worse; in fact it is, if anything, a little less than it was.

3905. With regard to fish passes, what do you say?—As regards the fish passes, the conservators would be very glad to put them up, but they really have no power.

3906. Do you think the supply of fish has been injured by the want of fish passes?—I certainly think they would be very beneficial; they get crowded beneath the mill weirs; the mill weirs

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destroy a very considerable amount of the river; I should think very nearly a mile of the river is injured by a mill weir; the water is dammed up above it, and no fish can spawn there, and they are impounded below these weirs, and if they spawn below the weir the spawn is floated away.

3907. This has been going on a great many years, has it not?—Yes; there is no doubt fish passes would be very beneficial.

3908. There is nothing new, however, about the want of fish passes?—No, nothing new at all; besides that, the millowners raise their weirs; they are continually raising their weirs.

3909. Why do you say these passes have not been made?—They practically cannot be made, because you cannot interfere with the water power; if you interfere with the water power, the millowner would aver, if you attempted to put a pass into his weir, that it would interfere with his water power.

3910. How came these weirs to be erected originally without fish passes?—These weirs have been erected a long time, and even with the new weirs you cannot get a fish pass put into it.

3911. Had the owners a right originally to erect their weirs without fish passes?—I do not think there was any notice taken of the matter.

Chairman.

3912. I think the fish were there before the mills. I take it that the ownership in fish, and the ownership in mills arose with the dawn of civilisation?—Yes. The law has absolutely recognised the ownership in fish, because it gives owners power under a 5s. stamp to appoint bailiffs. That, I presume, is a recognition of the ownership.

Mr. Seton-Karr.

3913. Now to come to a practical point. If the passes were erected, the fishing would be very considerably improved?—Yes.

3914. Larger spawning grounds would be opened up?—Yes.

3915. You were advised that practically you have no adequate remedy against the millowners with regard to the protection of fish passes?—Certainly not, and the millowners are continually raising their weirs, and there is no remedy.

3916. Have they a right to raise their weirs, or do they do so regardless of legal rights?—In the Main there are seven weirs raised.

3917. Have the fishery owners protested against the raising of the weirs?—There is no power to stop them now, except by an injunction, which is a very expensive process.

Chairman.

3918. You claim you are powerless in the matter?—Yes. I do not know of any power.

3919. I should think the common law would enable anyone who has ownership in the water to take proceedings. Now as a matter of fact have you taken any proceedings against the millowners for raising these weirs, or for not constructing salmon passes?—We took, I think, proceedings against one owner, Dungeness, for putting up a new weir without a salmon pass, but it came to nothing, and it is uncommonly bad where it is erected, for he put loose stones across the river, and then he has erected

Chairman—continued.

boards across, so that the water trickles through these stones, and it involves the absolute destruction of the fish.

Mr. Seton-Karr.

3920. I suppose one of the reasons why the millowners object to putting in fish passes is that if the fish pass is made they cannot raise their weirs?—It would be no use raising the weir afterwards, because the water would flow down the fish pass.

3921. Do you think this is a point on which Parliamentary power is required?—Certainly there is some power required.

3922. At present the fish owners are treated unfairly?—They cannot really put them in.

3923. They have no remedy if the millowner chooses to raise his weir?—No remedy that I know of.

3924. They have no remedy to compel a millowner to put in a pass?—Practically there is none.

3925. You have tried it, and you have failed?—Yes.

3926. Something has been said about American weed and drainage injuring the salmon industry?—I heard it said that American weed was injurious to the salmon fishery. Well, American weed grows virtually only in still water, and American weed has increased to a very considerable extent in the River Erne, and the salmon fishery there has increased, not decreased.

3927. The American weed does not come where the water is running at any speed?—No.

3928. It only comes in the slack water?—That is so.

3929. And pollen nets, are they injuring the salmon industry?—I think not. They are of an inch mesh. That is the same net that we use for capturing trout.

3930. It lets all fry through?—Yes; it does not kill the fry to my great extent.

3931. Something has been said about poisoning pike. The conservators have not given instructions to poison pike?—As regards poisoning pike, there have no instructions been given by any board that I am a member of.

3932. You do not think that any injury to the salmon can be ascribed to that?—No, certainly not.

Chairman.

3933. Or from the pike themselves, because, as I understood, the pike eat the small fry?—So they do.

3934. Is there any great increase in the number of pike which would destroy the small fry?—That I cannot, myself, give you evidence of. I am told by some of the bailiffs in the Bann there has not been, but I do not know myself.

Mr. Seton-Karr.

3935. The pike have always been there, I suppose, and are not worse now than they were 12 or 20 years ago?—In some parts I am told, it is believed there were pike put into the river.

Chairman.

3936. If there were any excess of pike in the Bann, I suppose you could destroy the pike; you could take steps to catch them?—They have tried.

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Chairman—continued.

tried. The bailiff netted for pike, and he got very few in the Main.

3937. And your evidence is that there is no great extent of pike?—Not as far as I know of.

Mr. Seton-Karr.

3938. You have read Mr. Macartney's Bill, and I believe you strongly object to it?—Yes, very strongly.

3939. What do you think will be the practical effect of that Bill, the way you read it?—As far as I can see, I believe that there would be no grating protections put on wheels at all. In fact, I think I am rather borne out in that by an answer of Sir Michael Hicks Beach to a question of Mr. Sexton in the House.

3940. What was that?—There was a question put by Mr. Sexton in the House to Sir Michael Hicks Beach as to what was the fact in England, and Sir Michael Hicks Beach says, "I am informed that the Boards of Conservators in England and Wales complain generally of difficulties which they experience in the erection of gratings at mills, under the provisions of the Salmon Fisheries Acts, in consequence of the absence of a means of determining beforehand the differences which frequently arise between themselves and the occupiers of mills on the subject, and that in many cases they abstain from erecting gratings from fear of the expensive litigation which might ensue, their funds being in most cases limited."

3941. You think if the Bill was passed that practically the millowners could put up turbines with impunity without protecting them?—I believe so.

3942. That is your view of what the effect of the Bill would be?—I believe so; yes, that there would be no protection.

3943. Under any circumstances it throws the cost of protecting turbines upon boards of conservators who have no money to do it with?—No funds to do it with.

3944. I suppose another great objection on your part is that no judge is provided who should say whether the guards are interfering or not with the effective working of the mill?—No, I do not see any one to determine that at all. There seems to be no power to determine that.

3945. That, in your opinion, is a very great objection to the Bill?—A very great objection.

3946. Have you any other specific objection to the Bill that you can mention to the Committee on looking it over?—At present I do not see anything except that, as I tell you, I believe no protection will be put up of any motor; and also that the conservators have no power to put it up.

3947. Those objections that we have enumerated are quite sufficient to kill the Bill, without anything further, I think?—Here are resolutions that were passed by the Derry Board of Conservators, which embody a great number of the objections to the Bill.

3948. What part did you take in those proceedings when those resolutions were passed?—I was not there at all when these resolutions were passed, but similar resolutions have been passed by the Board of Coleraine and the Ballyshannon Board, when I was present.

3949. Similar resolutions to these?—Yes, and

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Mr. Seton-Karr—continued.

these resolutions have virtually been passed by every board in Ireland. There is also attached to this a correspondence with Mr. Macartney as regards this Bill, and there is also attached Sir Michael Hicks Beach's answer.

3950. I suppose if the conservators had to put up these gratings, they would have to keep a man night and day to look after them?—Certainly they would have to keep a man to clean them, and I presume if they did not keep them clean, and that the mill power was interfered with in any way the millowner would at once take action. Also the mill hands may injure these guards, and the conservators then would have to go and put them up again.

3951. And that sort of thing might, I suppose, go on indefinitely?—I think so.

3952. In other words, the whole thing is unworkable?—I think so.

3953. I suppose the millowners are constantly altering their machinery, and the water-courses, and under those circumstances, of course, they would have to take down the gratings which you, under this Bill, might have erected?—Yes; I presume they would.

3954. Or they might do it under a plea of having to alter their watercourse, and you would have no remedy?—Not that I can see.

3955. Do you think that every mill established on a river inflicts an injury on that river for salmon for breeding purposes?—Certainly it does, because they are all erected near rapids or falls, and they dam the water up.

3956. How much of the river does it destroy?—I should think it would destroy about a mile, generally.

3957. Every mill destroys a mile of the river for breeding purposes?—I should think so, between the tail race and the dam. It seems to me that millers have done quite sufficient injury to salmon fisheries without throwing any more tax on the salmon fisheries.

3958. In addition to that, I suppose it is a fact that the expense of the mill largely increases the cost of protection against poaching?—I should think very nearly one-half of the cost of protection is spent on mills. The poaching takes place either below the weir or on the weir generally, and we have to keep a large staff of men continuously watching, and we have to put up houses to protect the mills.

3959. Therefore you wish to impress upon the Committee that the existence of the mills throws a very largely increased cost on your shoulders?—There is a tremendous cost thrown on the shoulders of the fisheries at present. I think the cost on the Foyle, as far as I can make out, comes to about 900 l. a year for watching the mills alone, and on the Bann it is about 500 l.

3960. The whole of that is for watching the mills?—Yes, for watching the mills alone, and the houses appertaining to them.

3961. You have no wish to do any injury, of course, to the water power of the mills?—Not at all. All we want is that the fry should be protected.

3962. For three months in the year?—Yes.

3963. And you believe that quite possible, without interfering with the mill?—I believe it is quite possible. I heard evidence

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given here by Mr. Shenton, I think it was, that turbines would be the future motor power through all Ireland, and if so, the Irish salmon fishery would be simply ruined.

3964. When smolts are going down to the sea they go down like a flock of sheep, do not they?—Yes.

3965. You have had a very large experience of salmon breeding, I suppose?—Yes, and I have kept smolts, and prevented them going to the sea. I have kept them in fresh water, and when they put on their silver coat they are very delicate, and if you keep them up they die.

3966. You have a large salmon breeding establishment of your own on the Erne, I believe?—Yes.

3967. And you are thoroughly conversant with the habits of smolts?—Yes. I heard evidence given here that smolts will be frightened by the vibration of the gratings before the mills. That is not the case at all. At least it is not my experience. Young fry will, but nothing will stop the smolts. They will overcome any obstacle nearly to get to the sea, just the same as the salmon will to get to its breeding river.

3968. It is an overpowering instinct, and nothing will stop it?—That is so.

3969. Applying that to the case of a large number of smolts in a mill-race which is unprotected, and where there was no bye-wash, these smolts must go through the turbine?—No power on earth will induce them to go up the mill-race.

3970. So that they must go through the turbines, and take their chance with the turbines?—Yes.

3971. I believe they are a very delicate fish, are not they, and that the slightest blow will crush them?—Yes, the slightest crush kills them.

3972. They are far more delicate than trout?—Yes.

3973. I believe you have studied the figures; can you give the Committee some idea of what the salmon fisheries of Ireland are computed to be worth?—I believe the salmon fisheries are worth about 600,000 £ a year.

3974. You think that fairly represents the extent?—I believe it does, yes.

Chairman.

3975. The river fisheries?—The river and sea fisheries.

3976. Would the sea fisheries exist without the rivers?—No, certainly not. The fish are bred in the rivers.

3977. And if the rivers are injured the sea fisheries are injured?—Yes, that is so, naturally and necessarily.

3978. The sea fisheries are entirely dependent upon the breeding in the river?—Yes, that is so.

Mr. Seton-Karr.

3979. The whole thing, I take it, turns upon the protection of the smolts?—Yes, that is the case. If you do not protect the smolts, you will have no salmon. I think I should read you here a resolution passed at a representative meeting

Mr. Seton-Karr—continued.

of fishermen in Dublin. On the 11th of February last, I, as a secretary, was requested to convey to the Committee "their unanimous opinion that if this Bill should become law the fisheries in Ireland would be destroyed on all rivers where milling power exists, or may be created, and many men fishing under their common-law rights would be deprived of their means of livelihood"; that was passed at a very representative meeting held in Dublin on the 4th of February last.

3980. What was the nature of the meeting?—It was a meeting of those interested in the salmon fisheries of Ireland.

3981. And thoroughly representative?—Yes, it was thoroughly representative.

3982. Representative of the whole industry?—Yes.

3983. One question more about your evidence on the destruction of smolts. It is only necessary that you should keep a smolt from the sea in order that it should die?—That is my experience.

3984. You need not injure them if you simply keep them from the sea?—Unless they get into the salt water, my experience is, they die. I have kept some hundreds of them, and they have all died.

3985. In what period?—Immediately they put on the silver coat. They die within a month, I should think, or within six weeks of putting on the silver coat, unless they are allowed to migrate.

3986. Any machinery which simply prevented the smolts having their silver coat on from getting down to the sea would be quite sufficient to kill them, without any actual injury being inflicted on them?—I should think so. At least, that is the result I found of keeping them up.

3987. Your experience has, I think, on that head been very considerable?—It has.

3988. The breeding of salmon is a point you devote special attention to?—Yes.

3989. During the period in which you have had charge of the Barn, the Foyle, and the Erne you say that in the Barn the fish has been very much diminished?—It has been reduced one-half during the last 12 years.

3990. How is it in the Foyle?—The Foyle has not been affected in any way at all.

3991. And the Erne?—The Erne has increased.

3992. Has there been any increase in the number of mills on the Erne?—No.

3993. Are there any turbines on the Erne?—There are two turbines there.

3994. Are they fenced off in any way?—One of them is. I could not tell you whether the lower one is fenced or not. The lower one is just at the sea. The upper turbine is fenced, but it is not fenced with lattice, nor do fry go near it. It is for the opening of the gates. There is a large drainage works there, and it has about nine feet of water standing above it. It has not very often happened, but immediately it begins to work the gate rises and the current goes away from the turbine. There is no current in the turbine. The fry can pass through the gates.

3995. I do not understand your description, but

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[Continued.]

Mr. Seton-Karr—continued.

but I have no doubt it does accurately represent what takes place there, but I understand the lattice, in order to keep the fry out, must be at the head of the tail race?—Not at the head of the tail race.

3996. Where would you put the lattice?—It must be on the head race somewhere or another, where the water is taken into the mill.

3997. At the beginning of the head race?—Anywhere on the head race, anywhere at all will keep them from entering the motor.

3998. I take it if you had it a little way down the head race, you would have the fry collect above it?—Yes, you have them impounded.

3999. They will not go back, they will stay there till they die?—I believe they will not go back.

4000. That is your experience?—Yes.

4001. Have you had any experience of an actual case where there has been a lattice or other protection a little way down the head race. You know of some cases, I suppose, where there are lattices now in use?—No, not at present. I do not know of anywhere where there are lattices, not at present.

4002. But I suppose it would be a matter of fair inference?—There are lattices in Ireland at present.

4003. In your view the lattice would not be a sufficient protection unless it was at the beginning of a head race?—No, I do not say that. If there is an outlet at the mill it does not matter if the lattice is erected at the mill itself, if there is a bye-wash.

4004. Now as to the population. Mills have increased on the Bann and the tributaries, have not they?—I could not tell you that. The tur-bizes have increased. I do not know whether

Mr. Seton-Karr—continued.

the mills have. I should think that the working mills on the Bann have diminished; I know some very large ones are unoccupied.

4005. When you say the Bann, you include all the tributaries to the Bann?—Yes, I am talking of the tributaries as well.

4006. Have you any facts on which you base your view that the population is diminished there?—No, I cannot say that I have any facts.

4007. It is a mere surmise?—Yes.

4008. I suppose many of the weirs on these rivers are old?—They are, yes.

4009. Are there any that have not been touched, but have been left in their original state?—I should think so, but I do not know.

4010. Would it be more difficult for the fish to get up into these untouched weirs now than it was formerly?—No, I do not think it would.

4011. There has always been a difficulty in the way?—Yes, always.

4012. You spoke of a net stretched across the Bann at Coleraine; how did the fish get past it?—I do not know how they got past at all. But that was long before I remember. I do not know how they got past at all.

Chairman.

4013. You gave an instance of Mr. Maeder-mott passing some fry through a mill. What mill was that?—It was a mill at Manor Cunningham.

Mr. Macartney.

4014. Who does it belong to?—To Mr. Anderson.

4015. Was it on the Bann?—No; it was near Derry. It is not a salmon stream at all.

Friday, 6th May 1892.

MEMBERS PRESENT:

Mr. Cox.
Sir John Whittaker Ellis, Bart.
Mr. Macartney.
Mr. O'Neill.

Mr. Finkerton.
Mr. T. W. Russell.
Mr. Selon-Karr.
Mr. Tomlinson.

SIR JOHN WHITTAKER ELLIS, BART., IN THE CHAIR.

Mr. R. L. MOORE, re-called; and further Examined.

Mr. Macartney.

4016. You have told the Committee that you were managing partner of the Foyle, the Bann, and the Erne Fisheries?—Yes.

4017. What is the nature of the partnership; is it a syndicate?—It is not a Limited Liability Company.

4018. It is not registered, is it?—It is not.

4019. Is it a private concern?—Yes.

4020. They are situated in the three different Conservancy Boards of Ballyshannon, Londonderry and Coleraine?—Yes.

4021. I will put to you the same question that I put to Colonel Cooper, and I shall be satisfied with any answer you choose to give. Will you give to the Committee the gross value of the amount of fish to the credit of these companies last year, or would you prefer not?—I submit that is a question I do not think I should answer without consulting my partners.

4022. Will you be good enough to consult them before the Committee closes its sittings?—Yes, certainly.

4023. Perhaps you will ask them if they have any objection to furnish the Committee with a return of the gross value of the fish for the last 10 years?—Yes. I have no objection myself to giving you the rental, and the cost of the Erne, if it is of any use to you.

4024. Certainly, I will take any figures you like to give. We will take the Bann Fishery first?—I am afraid I will have to give you the two together; there is no division between the Foyle and the Bann: 5,000 £ a year is paid for the Foyle and the Bann.

4025. How much for the Erne?—The Erne in 1869 was purchased with a life subsisting of 70 years. I am not quite certain as to the figures, but I think the rent was 1,100 £ a year then; and it was purchased for 45,250 £.

4026. The Bann Fishery is the most valuable of the three, is it not?—Oh, no, it certainly is not; I am speaking of course of the salmon fishery.

4027. The only reason I wanted to know, is to see how far the poor law valuation of fisheries compares with the real value, because the poor law valuation of the fisheries on the Bann are

Mr. Macartney—continued.

double that of any other fishery in Ireland?—But does that include eels?

4028. I cannot tell you?—I think the rent of one of the eel weirs in the Bann is 2,000 £ a year.

4029. Possibly that may be so; it appeared to me to be very extraordinary. It is 208 £ a year, and the next most valuable is 95 £ at Londonderry?—The valuation is far more than that.

4030. I am only going by the returns of the fishery inspectors; whether they are accurate or not I cannot say, what has been paid last year and for several years has been 95 £?—That is the ten per cent.

4031. Yes, I mean to say 208 £ was the 10 per cent. on the valuation?—Yes; at least I do not know whether it is 208 £; it is the license duty, plus the 95 £, whatever that comes to.

4032. In Londonderry it was 95 £?—But the valuation represents the license only, plus 95 £.

4033. I do not quite understand what you mean?—There are a number of net licenses taken out. If there were no nets at all taken out in Londonderry, the 10 per cent. would be a great deal more than 95 £. There are a number of net licenses taken; I do not know exactly what the amount is, but it is in the book; say it is 130 £ or something like that, and if you add 95 £ to that it would represent 10 per cent. payable on the valuation.

4034. Which nets; the drift nets, the draught nets and bag nets?—No, the draught nets and stake nets.

4035. What are stake nets, because they do not appear here?—There is 90 £ for the stake nets.

4036. What are they called in the Fishery Inspectors' report?—I should think they are called stake weirs.

4037. There are stake nets, bag nets, and loop nets?—Are there no stake weirs?

4038. Yes, you are right, there are three stake nets, 90 £. Are they not included in the poor law valuation?—Yes, they are; so that it is 130 £ or so for the nets taken out. If you add

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[Continued.]

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add 95 £. to that, that would virtually represent the 10 per cent., but the 133 £. does not come up to the 10 per cent. on the valuation; therefore there is 95 £. more paid. Have I made myself clear?

4039. I understand from you now that this report is not accurate, and does not exactly represent the true facts?—Yes; it is accurate.

4040. I understand from you that the 95 £., for instance, does not represent what is accurate. Your explanation is clear, but it carries to my mind that the 95 £. here as representing the 10 per cent. on the poor law valuation, is not the full sum that ought to be paid?—Yes, it is. 95 £. is the extra sum besides the license duty paid to bring it up to the full 10 per cent. The license duties are 95 £. less of the 10 per cent. on the gross valuation.

4041. Then, as a matter of fact, 10 per cent. is not paid by the fishery owners on the poor law valuation?—Yes, it is.

4042. If they happened to have taken out licenses for certain nets?—For instance, in the Ballyshannon district there is no 10 per cent. paid, because the license duty represents more than the 10 per cent.

4043. Therefore, where the license duty represents more than 10 per cent., the fishery owners have not got to pay the percentage I understand?—Yes.

4044. That I observed in the Ballyshannon district, and I was going to ask you about it. I see that in the report for the last two years the inspectors of Irish fisheries comment on the fact that fishery owners in the Ballyshannon district have not paid their 10 per cent., and that no effort has been made to make them, I think?—That is the comment in the report.

4045. Are they justified in making that comment?—Not as far as the Erne is concerned; I do not know anything about the other fisheries. You see that the Erne pays 267 £. 2 s. 6 d. more than their license duty.

4046. Then the inspectors of fisheries would have that before them, would they not, when they presented this report?—Certainly; it is in the body of the report here.

4047. Do you not think then that is rather misleading, if they put in the report as to the Ballyshannon district, that the amount due in respect of the 10 per cent. valuation has not, in all cases, been paid by the board?—There are other rivers in the district than the Erne, but I do not know anything about them; I do not know whether they have paid or not paid.

4048. Are you a member of the conservancy board for the Ballyshannon district?—Certainly.

4049. Would it not be a matter of importance to you, interested in the preservation of salmon, to see that every effort is made to recover, especially from proprietors of fisheries, any sums which they ought to pay?—Certainly, they should do it no doubt.

4050. I want to clear this matter up. You say that this paragraph in the report. "For the last two years the amount due by the proprietors of fisheries in respect of the 10 per cent. rate and valuation, has not in all cases been paid to 0.9Q

Mr. Macartney—continued.

the board," is not accurate. How would that come into the Inspector of Fisheries' report. How would they have cognisance of that; would it be through the action of your conservancy board?—I suppose they would send questions down to the clerk and he has answered that; that he has written to them, I suppose.

4051. I think you will perhaps agree with me that this appears to be a comment of a hardly favourable character on the proprietors of fisheries?—I think it is not.

4052. But your view I understand, is that they need not pay this, and are not bound to pay it?—They are bound to pay the 10 per cent.

4053. Then I cannot quite understand your explanation?—Let me take the Erne. I think that 108 £. is the license duty, or somewhere about that, that the nets in the Erne come to.

4054. For what?—For the nets.

4055. For stake nets?—All nets; boxes and stake nets.

4056. Would that include draught and drift nets?—No, not drift nets; draught nets.

4057. I have the figures here?—No, I think you could not pick them out of that report.

4058. I am bound to say, that hardly any figure appears to be correct in the reports?—Yes, I think it is correct, if you take it at 108 £.

4059. There is very vast difference here, because the draught nets are put down at 126 £. and 120 £. for the last two years?—Yes, that is right enough; but then there are more rivers than the Erne.

4060. Are you speaking of the Erne alone?—Yes, I am taking the Erne alone. You asked me to explain the 10 per cent.; I think as I said it is 108 £. that is paid on the Erne in license duty for 1890, and in 1891 it was 123 £. The valuation of the Erne fishery is, I think, 850 £. You will see that 108 £. more than covers 10 per cent. on 950 £.; therefore, there is no supplementary payment by the proprietors there for the 10 per cent.; have I made that clear?

4061. Yes, I understand your point; is that a statutory exemption?—If you take out license duty to the amount of 10 per cent., you do not supplement it. In the Foyle, it is the reverse. The license duty does not come to the amount of 10 per cent.; therefore, there is 95 £. paid as 10 per cent. in addition to the license duty to make up the 10 per cent. on the whole.

4062. As far as the Erne Fishery Company is concerned, I understand your position; but there must be other proprietors, I presume, or the Inspectors of Fisheries would not have made this remark?—I do not know what proprietor it alludes to. If you will read that Clause you will see that Messrs. Masgrave contributed 35 £. 10 s.

4063. And they the only other fisheries in the district?—No, there is the Bandrows.

4064. But these are subscriptions I presume?—Yes.

4065. They would be included in the amount of 236 £. 12 s. 6 d. which appears in this account, I suppose?—Yes.

4066. There

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[Continued.]

Mr. Macartney—continued.

4068. There must be other proprietors of fisheries in the district that have not paid their 10 per cent., must there not?—I do not know of any other that is very large, excepting the Bundrows.

4067. Copies of these reports, I suppose, are sent down to the Conservancy Board?—Yes.

4068. Do you ever read them?—Yes, but I never observed that before.

4069. But for two years running, the Inspectors of Fisheries have called the attention of the Ballyshannon Conservancy Board to the fact that there are proprietors of fisheries that do not pay the 10 per cent., have they not?—Yes.

4070. And no action has been taken?—Not that I know of.

4071. Has there been no inquiry taken by the Board to find them out?—Not that I know of.

4072. I suppose you are an active member of the Board?—Yes, I generally attend it.

4073. You said with regard to the Bann that there are a hundred miles of the Bann and its tributaries available for salmon breeding?—Yes, that is what I said.

4074. At what period do you speak now?—That is in the present year.

4075. For how many years past?—I should say virtually from the time that these turbines began to be erected.

4076. There are a hundred miles you say?—Yes.

4077. Would that include the tributaries in the counties of Down, Tyrone, and Armagh, as well as in Antrim?—The whole tributaries of the Bann are far more than a hundred miles.

4078. Is your hundred miles of the Bann confined to the Bann itself?—No.

4079. I am not trying to catch you, but I only want to know whether amongst the hundred miles you speak of there would be tributaries in Tyrone and Armagh and Down and Antrim?—Those are the tributaries that flow into the Bann; of course a great number of them are stopped altogether; for instance, the Blackwater.

4080. You do not include the Blackwater at all in this calculation?—No.

4081. Not at all?—No.

4082. At any time?—I do not include it in that hundred miles because it is stopped. I could not give you the particulars of the different millages. I have taken out the different millages of the different rivers that are not stopped by either mill weirs or turbines.

4083. Are there any tributaries flowing in the county Down within these hundred miles?—No, I think not.

4084. Then you would confine yourself to the Bann, and its tributaries in Derry and Antrim?—No, there is Tyrone also.

4085. But the Bann itself, so far as the main river goes, would be affected by the water sent down by the tributaries rising in Down, Tyrone, and Armagh?—Of course it is. As regards the Bann itself I do not know of any place scarcely in the Bann where there is spawning.

4086. Do the fish spawn up the tributaries?—Yes.

4087. You of course are aware, are you not, that the counties in which the tributaries of the

Mr. Macartney—continued.

Bann rise are some of the largest flax-growing counties in Ireland?—Yes.

4088. You are aware also, are you not, that, taking the county Antrim, in the last twelve years the flax area has considerably increased?—I am not aware of that.

4089. Are you not aware that there is a very much greater amount of flax grown there than there used to be twenty years ago?—In the last twelve years I suppose there is.

4090. For instance, say 15 years ago, the largest production of flax came from Down and Tyrone, and last year Antrim was at the head of all, according to the returns?—Yes, it may have been so.

4091. The consequence is that the water of any river fed by tributaries that rise in Armagh, Tyrone, Antrim, and Down would contain a very large amount of flax water, would it not?—Of course it does; no doubt it does.

4092. And flax water I believe is extremely injurious to fish?—I have tried that by experiment, and if they are about mixed half-and-half the fish can live in it.

4093. Sometimes I fancy the mixture is almost greater than that, is it not?—I should think not.

4094. Have you any knowledge at all of the Blackwater?—I only know it; but not intimately.

4095. That carries down a tremendous amount of flax water, does it not?—I am sure it does.

4096. And practically the fishing on the Blackwater with regard to all kinds of fish has almost ceased, has it not?—That I do not know.

4097. There is hardly any fishing at all in it now, is there?—I do not know. I do not think salmon can get above Benbulbin in the Blackwater.

4098. I am talking about trout fishing, which used to be very good, but is now completely destroyed. At all events salmon would not be likely to flourish in the river in which there was a quantity of flax water coming down, would they?—I have told you fry will live where it is half-and-half. I have tried that by experiment.

4099. In the Reports of the Fisheries Inspectors these are continual references in the Londonderry district to the effect that considerable damage is done by flax water; and there is also allusion to destruction of fry by anglers when the fry are going down, and also about fish; I suppose you have noticed that;—Yes; but with all those destructions in the Foyle the Foyle has not decreased.

4100. Yes, it is going on. I want to ask you upon whose authority the Inspectors of Fisheries make these comments?—They are generally made from the Reports sent in by the Clerks of the Conservancy Boards.

4101. Can you suggest a reason why, during the years that have elapsed since the turbine first came into use, there is no reference made in any of the reports as far as I am aware; I shall be glad if you will point out any such reference, for I have not been able to find any reference, to the destruction caused by turbines in these conservancy districts?—I do not know; I did not look to see if in the Bann there is any or not.

4102. I mean

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[Continued.]

Mr. Macartney—continued.

4102. I mean in any conservancy district?—I do not know that there is.

4103. According to your view this destruction has been of a very material extent, has it not?—Yes.

4104. And going on for some years?—Yes; as I have told you the Bann has decreased in the last twelve years.

4105. Possibly that may be, but do you attribute that entirely to turbines?—Destruction has been going on. I find one of the witnesses, Rae, who was brought up at Randalstown by Mr. Webb, proved that at Mr. White's mill there was a tremendous destruction of fry.

4106. I am not asking what was found by anybody else, but I want to ask if you can make any suggestions to the Committee as to why this enormous destruction of salmon fry was going on by turbines to the knowledge of the officials of the conservancy district, or the members of the board; there is not one single comment about it or reference to it in the Report furnished to Parliament by the Inspectors of Fisheries?—I cannot tell you.

4107. These reports have been framed according to your view on information furnished to them by the officials of each Conservancy Board, have they not?—Yes; I cannot tell why the inspectors have not alluded to it, because the question of turbines in the Bann district has been continually before them.

4108. Has your board made reports to them? They have been continually asking their advice on the subject of these turbines.

4109. But have you made any reports as to the damage?—Not that I know of; I could not tell you. I could not tell you what the clerk has reported.

4110. Will the clerk be called here?—Not that I know of. We do not purpose calling him.

4111. Do you think you will be able to give any information to the Committee in any way before the end of its sittings, as to whether any official report has been made by your board on this question?—I think there are resolutions on the books of the Conservancy Board that a prosecution should take place with regard to these turbines, and I think there are letters in existence from the Inspectors of Irish Fisheries calling the attention of the Conservators to this question and asking them to prosecute. If that is what you desire, perhaps I could get it.

4112. No, because we know that no definite action was taken till about 1889, and according to your evidence this destruction has been going on for some years?—It has, and, as I tell you, in 1885 (I think it was) the millowners' attention was called first of all to the question of having no gratings up.

4113. Generally?—That I could not tell you; I should have to get the resolution.

4114. I am informed that nothing was done, and that that is a mistake. However, if the Conservancy Board of Coleraine can supply any printed notices to the Committee of that year, I shall be glad?—I do not think there were printed notices issued in that year.

4115. In what form was it done?—I think the inspectors were directed to call on the mill-

Mr. Macartney—continued.

owners and ask them to erect protections at their mills. That is as much as I can remember.

4116. Was that in 1885?—Yes, in 1885.

4117. Do you keep minutes of your board meetings?—Yes.

4118. Would the minutes of the board show a resolution of that sort?—I think it is most likely.

4119. Perhaps you will be good enough to ascertain?—Yes.

4120. I want to know the earliest date at which any steps were taken with regard to the millowners?—I will try to get you that. Do you mean as regards turbines?

4121. Yes, with regard to the protection of turbines. If there is any resolution of the board, I should like to know the date of it?—Very well. I am nearly sure 1885 is right, for I think I got it from the clerk myself. But would it not be better for me to get the clerk to write direct to the chairman, or shall I send them in myself?

4122. You can hand them in, unless you are going to call the clerk?—We do not purpose calling the clerk.

4123. You are here as a member of the board, and can put that in at any time. You have attributed a considerable amount of the damage caused to the Bann fishing to mill dams, have you not?—Mill dams damage fish everywhere, to a certain extent.

4124. Why. Do I understand that is because, in your view, there is no proper provision for the salmon getting over them?—No, the salmon cannot get over them, except in times of flood.

4125. Because of what?—Because there are no fish passes.

4126. How is it there are no fish passes in the Coleraine conservancy district, when nearly every other district in Ireland seems to be amply provided with them. Colonel Cooper told us there was ample provision in his district, and there was no difficulty about the dams there?—There is provision to the Bann proper itself; there are fish passes, but they are very ineffective. They were put in by the Board of Works.

4127. Why are there none in the tributaries?—As I have told you before, it is cumbersome. There is no penalty; you can only inflict to get a fish pass put in.

4128. Are you going to call the solicitor to the Board?—Yes, of Londonderry.

4129. There is a clause in the Act 5 & 6 Vict., which I do not think has been repealed, in which the Commissioners (and I suppose the Commissioners would act on the suggestion of the Conservancy Board) can compel owners of weirs and dams to make proper provisions, is there not?—Provided it does not interfere with the working of the mill.

4130. Do you mean to suggest that to the Committee with reference, for instance, to the dam above Mr. Webb's mill?—Had you not better generalise?

4131. I will take it generally. Do you mean to suggest to the Committee that it is impossible to place in a dam a proper fish pass by which

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Mr. MOORE.

[Continued.]

Mr. Macartney—continued.

salmon can get up the river without stopping the effective working of a mill?—I believe you can put no fish pass which will continually have water in it in any dam that will not diminish the water supply to the mill.

4132. It may diminish it certainly; that I quite understand; but do you mean to say it is impossible to do it without interfering with the effective working of a mill?—I presume when a mill takes all the water that comes down a river, if you remove some of that water and pass it over a fish pass, that the miller would aver that it diminished his power.

4133. At what period of the year is it most necessary to have plenty of water in a fish pass?—In the autumn.

4134. At what time of the year have the rivers in your district least water?—They have least water in the summer.

4135. Therefore there would be surplus water (and practically that is the evidence of the mill-owners in the Coleraine district) in the autumn, when it is necessary to have it?—Not always; when there is flood in the autumn it is spread in a thin layer over the weir, so that no fish can pass up. A fish pass to be effectual should have water continually running through it.

Chairman.

4136. What depth of water would a fish pass require?—I do not know exactly; I suppose a foot would do.

4137. A fish pass is a sort of cascade, is it not?—There are a variety of fish passes. The fish passes on the Bann are made zigzag, and they are not effective at all. The salmon are supposed to run so-and-so as it were (*describing*).

Mr. Macartney.

4138. Are you aware that there are in Ireland effective fish passes upon dams?—Yes; I put up one myself, as you have heard in evidence, on the Maguire's Bridge.

Chairman.

4139. Will you describe that?—The fish pass on the Maguire's Bridge River is simply a dam below a dam, making simply two steps instead of one; and it has nothing to do with the weir at all. It is not attached to it.

4140. What pass is necessary in a mill dam to enable the fish to get up; what depth of water would be required?—I think a foot.

4141. How wide would it have to be?—It depends greatly on the configuration of the weir.

4142. You understand that what I want to know is how much water would be likely to be lost to a mill by the construction of a fish pass?—I cannot answer I am afraid. You will have an engineer before you who is acquainted with that.

Mr. Macartney.

4143. Does he know anything about fish; does the engineer come here as an expert in fishing as well as an engineer?—I do not know.

Mr. Macartney—continued.

4144. Are you aware that in England and Wales in rivers on which there are mills, and in which salmon exist notwithstanding the devastating character of the turbines that are there, there are fish passes which are perfectly satisfactory to the fishery owners?—I know there is a very great difficulty about it. I saw in the English report of 1890, that there was a great deal of difficulty about getting fish passes put in. I do not know whether I could put my hand upon it.

4145. But they do exist, do they not? They do exist.

4146. And they exist also in Ireland; can you suggest to the Committee any reason why your conservancy board should not have made some attempts, at all events, to carry out the powers with which they are vested by the Act?—Because we are advised by the solicitors that we really cannot do it under that Act. There is no power of compulsion, and that we could not put in a fish pass without the consent of the millowner, and that that consent would never be obtained.

4147. Have you taken counsel's opinion upon it?—No, I do not think we have.

4148. It would be a very important matter to the fishery owners and the conservancy boards, would it not?—It is a very important matter.

4149. On a question of law like this, with an Act of Parliament passed for the purpose of endowing the authorities with ample power apparently, do not you think it would be wise to take the opinion of counsel before you abandoned it altogether?—They have sufficient confidence in the solicitor who advises them.

4150. Would not your confidence be a little shaken in the opinion your solicitor gave you if you found in other districts in Ireland conservancy boards had been able to carry out exactly what he tells you you cannot carry out? No, it would not; it would depend on the surroundings. Now, with reference to Colonel Cooper's fishery, the fish pass is put up at mills which belong to himself, I understand.

4151. I do not quite understand that; I understood the mills belonged to the lessees of the mill?—But he told you, I think, that he had made a 99 years' lease to them.

4152. I do not think his evidence gave the Committee to understand that; I understood that he was on very good terms with the lessees of his mill, and that he went to him and called upon him to fence off his turbine in accordance with the Act of 1863; but he did not give the Committee to understand that he had any special provisions in the lease that then existed?—I do not think he did. That fishery was created either by Colonel Cooper or his father, I do not know which, and I suspect those mills were built by him, and therefore, when he had it in his own hands, he built proper fish passes. That is only presumption; I do not know it myself.

4153. As far as you are concerned, and the Conservancy Board of Coleraine are concerned, they have never attempted as long as you have been a member of the board to carry out any provisions of the Salmon Fishery Acts, which apparently would give them power to insist upon

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Mr. MOORE.

[Continued.]

Mr. Macartney—continued.

fish passes being put up, have they?—No, because they believed it was inoperative.

4154. They believed they could not do it?—Yes.

4155. And they were satisfied with that belief, on the opinion given to them by their legal adviser, and they have not taken the opinion of counsel?—Not that I know of. I should like to read you here the report of the inspectors for 1890: At the end there there is, "Erections in rivers. No complaints of new erections in rivers during the past year have been made to us. We still, however, are of opinion that the law in respect to this class of offence should be amended, so as to provide a penalty for non-compliance with the provisions of the present Act of Parliament."

4156. Do you say that an erection in a river is always a dam, or that it means a dam, in the reports of the inspectors, and in the fishery laws?—I believe so.

4157. Is that your interpretation of it?—Yes, that is my interpretation of it.

4158. And that it means nothing else?—Sir Thomas Brady and Mr. Hornsby will be called, and I dare say they will be able to explain it better than I can.

4159. You have attributed a certain amount of the damage to the fishery of the Coleraine district to mill-dams, to turbine wheels, and I think you said something about other motors?—I said other motors.

4160. What do you mean by that?—Of course, the bucket wheel does a certain amount of damage.

4161. And poisonous matter?—Yes, and poisonous matter.

4162. You said you knew the Six-Mile Water, and that it formerly was a very good breeding stream. I presume you meant salmon breeding? Quite so.

4163. At what period do you say the Six-Mile Water was a very good salmon-breeding river?—That I cannot absolutely tell you.

4164. Do you know the river, or did you ever know it at any time, intimately?—No, not intimately, but I know the Six-Mile Water.

4165. Are you prepared to adhere to your statement that it is a very good salmon-breeding river?—My evidence is founded on the reports of the bailiffs.

4166. Not on your own knowledge?—Not on my own knowledge.

4167. Which bailiff; anyone in particular?—The chief bailiff in that district is Mr. Moles, who was produced here.

4168. At all events this statement of yours that the Six-Mile Water was formerly a very good breeding stream, is founded entirely on what Mr. Moles told you, is it not?—Yes.

4169. And you know nothing at all about it yourself?—Not of my own knowledge.

4170. The only reason I put it in, that it is not a salmon-fishing river at all, but only a trout river. Are you inclined to attribute more destruction to the turbine wheels than to the pollution coming from the mills that are on the Six-Mile Water?—As far as the pollution of the Six-Mile Water is concerned, they erected settling

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dams there about four years ago, and the water is clear now.

4171-2. So that there is no poisonous matter now coming down in your view?—There may be but I do not know sufficiently about it. With reference to Mr. White's mill on the Six-Mile Water, according to Mr. Rae, one of the witnesses, at Randalstown there was terrible destruction.

4173. You have not called Mr. Rae here?—No, he was the witness who gave evidence at Randalstown in the prosecution of Mr. Webb. I will read what he said, if you will allow me. "Hugh Rae produced models of the mill and turbine wheel. Witness had been eight years in Mr. Webb's employment, and during all that time he had never seen salmon fry passing through the grating into the turbine. The grating was regularly cleaned out, and he had not on any occasion seen dead or live fish there. Previous to entering into Mr. Webb's employment, he had been engaged by Mr. White, of Muckamore. Formerly, in that gentleman's mill a turbine driven by means of a pipe had been in use, but as that had been found to kill the fish in the river it had been altered to one of the same kind as that used by Mr. Webb."

4174. That was a different turbine?—But I presume it is not one turbine you are directing your attention to, but to different kinds of motors.

4175. On the question of turbines they are practically all of the same character that are now being put up. That particular turbine they were talking of is one which is absolutely out of date now?—But they are quite as destructive I believe.

4176. That is your view?—The reason I say that is, in speaking to Mr. Cadie the other day, I observed that he did not say the Leofel turbines did not kill fish; he said he thought they did not. He pointed out to Sir Thomas Brady and myself the other day other species of turbines which he had at the Cattle Show at Dublin, and said, "I would not like to say fry would pass through them."

4177. I quite agree with you, and I quite agree that Mr. Cadie did not assert what he could not possibly know; he naturally confined his evidence to what he was absolutely certain of. I want to ask you a question or two about the income of the board, for I did not quite understand it. Take the Londonderry Board; the income of the board is made up of licenses for rods and nets; fines, percentage on poor law valuation, and subscriptions, is it not?—Yes.

4178. Those are all the items of the income of the board?—Yes.

4179. The subscriptions, of course, are voluntary subscriptions, principally paid, I presume, by owners of the fisheries in the district?—They are. In the Foyle the subscription is paid altogether by the lessees of the Foyle.

4180. Are there any other fisheries there besides your fishery company?—In the Foyle itself.

4181. Yes?—Yes, the Duke of Abercorn has a fishery and Lord Erne has a fishery. I think those

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those are the only commercial fisheries. Sir William Style has one I think too.

4182. Apart altogether from those subscriptions, which appear here on the account furnished, do you say that the salmon fishery owners expend any further money in protecting their fisheries?—Yes, I think I said 700 l.

4183. I want to make that quite clear. I was not certain whether over and above the 555 l., or whatever may be the amount of their annual subscription, the fishery owners themselves spent something besides that?—They do.

4184. Is it a very considerable amount?—£. 700.

4185. Does that 700 l. come out of this income given here?—It is outside it.

4186. Outside those subscriptions?—Yes.

4187. You spoke of the number of men that were employed, and you took it at 2,000 men?—That is including all those districts.

4188. Are those men employed all the year round, or only from time to time?—No, they are not employed all the year round.

4189. What would be the average amount earned in a year by them?—I am afraid I cannot tell you. That I do not think I know. I can get you that if you wish.

4190. I should be glad if you could. They would not solely depend on the wages paid to them, would they?—Not solely. I believe a great number of the salmon fishers around the coast depend on it.

4191. Do you include these in the 2,000?—Yes.

4192. So that those men who are fishing in the 160 boats would represent about 1,000 men?—Yes, about. I think they really represent a great deal more, because I find in looking at the inspector's report there are 152 boats alone registered in Killybegs, with the coast guard, and a very large number of those fish for salmon.

4193. Would the salmon which they catch go by rail?—Yes.

4194. From Killybegs?—Not from Killybegs; there is no railway to Killybegs.

4195. How would it be shipped?—It would come to Donegal and be carried from Donegal to Derry.

4196. It would not go round by sea to the market, I suppose?—There are no means of communication. I suspect some of it does go into Sligo, because it is not very far to run across the bay.

4197. Where would it principally go from?—From Buncrana.

4198. Would it be carried there?—I think they would sail across.

4199. Would it go over the Finn Valley line?—I should think a good deal of it went over the Finn Valley line.

4200. Do you think the salmon trade at Killybegs is material in amount in the year?—Last year it was enormous. There were as many as 80 boxes per day coming into Derry last year from Donegal.

4201. From Killybegs?—Yes, from that district.

4202. Are all the boats that are registered at Killybegs local boats, or are they English,

Mr. Macartney—continued.

Scottish, and Irish boats?—I think they are all Irish boats; I think there was one English trawler there the year before last, but not last year I think.

4203. What district is Killybegs in?—I think you will find it at the end of the salmon report.

4204. What conservancy district is it in?—In the Ballyshannon conservancy district; but it is in the sea report you will find it registered with the coast guard.

4205. We have it in evidence, and I suppose you will agree, that the sea salmon fishing depends entirely upon the state of the river fishing; I mean if the rivers are not properly protected, and there is any damage done to the fish when spawning and coming down, the sea salmon fishing will go to the bad?—Certainly; and so it has. For instance, take the bag-nets at Portrush, which are supplied by the Bann, there is a tremendous decrease; quite equal, I believe, to what it is in the Bann.

4206. Do the owners of these sea salmon fisheries make any contribution to the protection of the fish?—The owner of the fishery at Portrush has made a small contribution, but not very large, to the protection of the Bann.

4207. What do you mean by small?—I think 10 l. or 15 l., or something of the kind.

Mr. Fiskerton.

4208. That is the Earl of Antrim's fishery, is it?—Yes.

Mr. Macartney.

4209. There is no legal obligation on them to make a contribution, is there. The fisheries are not valued in any way, are they?—Yes, they are.

4210. For instance, the boats at Killybegs fish for sea salmon, do they not. Where do they fish for salmon?—All round the Donegal Head.

4211. What do they pay?—Those 152 boats pay nothing at all.

4212. So that the owners of those boats, who are benefiting by the salmon that are bred in these rivers, pay nothing at all?—No.

4213. I suppose that would apply nearly to all the boat fishing around Ireland?—No, it does not apply, because some of them take out licenses. The greater number of those 152 do not pay any license at all to the board of conservators.

4214. But apart from such licenses as they may take out, they do not pay anything else?—No, they pay nothing else.

4215. For instance, do those 160 boats fishing between Portrush and Ballyshannon take out licenses?—I calculate that 130 take out licenses; at the time I did not know there were so many more boats fishing; and I added 15 for each district as not having taken out licenses. That made the 160; but if you take 23 from the 130, that will represent the Bann district, and the Foyle and the Ballyshannon district, leaving out all the coast line all round.

4216. Are those licenses paid into the account of the conservancy district?—They are.

4217. But apart from the licenses, they make no contribution whatever to the expenditure incurred

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incurred in the production or protection of salmon, or anything, do they?—No; they trust that those interested in the rivers will try and produce as much salmon as they can, and therefore they think they may lie by, and let the cost fall on other shoulders.

4218. But according to your view, I understand it is of quite as much importance to them as it is to you, to have the salmon properly protected in rivers?—Certainly it is. If the salmon are decimated their means of livelihood is gone.

4219. Do you think then they might be properly called upon to contribute a little more?—I think they might be.

4220. I am only asking your opinion. Do you think it would be fair? They make a living and a profit out of it?—They do.

4221. And with the exception of the licenses, they contribute nothing whatever to the production or protection of this industry, do they?—Nothing.

Chairman.

4222. Within what range do they pay licenses for their sea fisheries?—There is a limit of three miles, and a mile on each side of the river, where they cannot fish.

4223. Is that your river?—Any river.

4224. Do they pay licenses for fishing within that limit?—No, outside the limit.

4225. Within what range. I suppose, if they get out into the Atlantic they do not pay?—Yes, they ought to pay licenses where they are fishing for salmon, no matter where it is. The license duty goes then to the protection of the rivers, and there are certain districts. This map which represents the different districts will probably make it plain to you. It is taken from the fishery report.

4226. What does the red line mean; the limit of the river fishery?—I think the red line means the limit of the Conservancy Board.

Mr. Pinkerton.

4227. The owners of fisheries claim a right to fish inside that limit and prevent other people fishing inside that limit, do they not?—Of course there is the three-mile limit. The conserved division is defined in blue. The blue figures refer to the number of registered boats.

Mr. Seaton-Kerr.

4228. Fishing boats?—Yes. The coast line of the counties is defined in red. The red figures refer to the total amount of boats.

4229. There are two sets of blue figures?—One refers to the boats, and the other to the men who are respectively registered.

Mr. McCarthy.

4230. You said that you had visited some of the mills on the Bann?—Yes.

4231. When did you first pay a visit to, say, the Maine?—It is a good many years ago. I do not know how many years ago.

4232. Within recent times; say since you were a conservator?—I have been a conservator since 1864.

4233. Have you been in the habit of visiting them regularly?—No, not regularly.

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Mr. McCarthy—continued.

4234. Do you recollect what caused you to go, we will say, within the last ten years?—I visited them last autumn, I think it was, I told you.

4235. But before that had you been on the Maine?—Yes.

4236. With what object did you go there?—I went to see the state of the river, and how the bailiffs were distributed, and what the protection was like.

4237. You visited some of the mills then, did you not?—I am sure I did.

4238. Did you see any of the millowners then?—I suspect I did, but it is a long time ago, and I do not remember.

4239. Do you not recollect if you said anything to them about this destruction; did you see any turbine wheels then?—I think the time that I was on the Maine before last autumn was before the turbines had become introduced much.

4240. Are you sure you have not been there since?—I do not think I have; I do not remember it.

4241. As a matter of fact, I am sure you have been?—I do not remember. I was, of course, at Mr. Webb's at Randlestown three years ago, but I did not go with that object then. I went with the object of finding out whether there was any suitable place to erect hatcheries on the Bann or its tributaries.

4242. You say you visited the mills last autumn with Mr. Hassard?—Yes.

4243. You said that you saw some of them protected, but that the fry guards were not up, because it was not then necessary. You saw the fry guards lying about. I think you have heard the evidence of most of the millowners who have been called before the Committee, have you not?—I have.

4244. And I think I may fairly put the result of their evidence with regard to the fry guards as that they were practically never used, and that they keep a watch, and when necessary put down the fry guards for the purpose of evading the inspection of your bailiffs, and water keepers; but that as a matter of fact they take them up the moment after they left?—Yes, I heard them state so.

4245. You are not prepared to say that that is not the case, are you?—Certainly not, I know nothing about it.

4246. Then you went on to Mr. Gibson's mill, and you saw the protection of the turbine wheel there. We have had the evidence about that. It is not a very modern turbine, and we have been told that such a protection as that would be impossible with one of the new turbines; but I think you do not wish to give evidence as an expert on the turbine question?—No.

4247. With regard to the protection of fry, in your opinion is it possible to put up anything which would prevent fry making their way in the water with a less mesh than three eighths of an inch?—I do not approve of that one which is here as a guard at all.

4248. I am not asking about that particular shape; I am asking about the size of the mesh?—I do not think so.

4249. Is three-eighths of an inch the largest aperture in lattices which would be an effective protection

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protection against fry making their way in the water?—Three-eighths of an inch is the largest aperture that there should be in a fry-guard.

4230. Anything larger than that you say would not be effective; is that your view?—Yes.

4231. But the evidence of the millowners, which is before the Committee, is that a lattice with a mesh of that character, apart altogether from any question of being choked up by rubbish or *détritus*, or anything of the sort, would have such an effect on the volume of water feeding the turbine, that it would practically take away the effective working of the turbine. I put that as the effect of the evidence which we have had?—But that lattice is a very different thing even if it is three-eighths of an inch. I especially guarded myself in answering the question you put to me. You said "lattice"; I said "fry-guard," three-eighths of an inch.

4232. I do not care what you call it?—Excuse me, that is three-eighths of an inch of a lattice of wirework, but you may have plates with openings three-eighths of an inch with openings not so close as that together.

4233. Of course if the openings are not quite so close together, a less amount of water would come through. Supposing we took the whole end of this room and made a sheet of iron with five holes of three-eighths of an inch, very little water would come through; if you perforated the whole with holes three-eighths of an inch, there would be considerably more, would there not?—Of course it depends on the size of the guard. I presume if you have them perforated at a less distance than that, and the size of the guard is the same, that more water would come through it, provided it is clean, than there would come through a perforated plate with five holes of three-eighths of an inch.

4234. Assuming that this view of the millowners is correct, and that it would cause a material difference to the water-power, is it your view that it is absolutely necessary that guards should be put up?—Assuming that the millowners' view is correct, as you state it?

4235. Yes. I am asking you to assume that as a fact?—Assuming it is correct as you have stated it, it is my view that some means of protection is necessary.

4236. I am asking you first of all about this particular thing?—No, I do not say that, nor does the Act of Parliament say that.

4237. Would you then describe to the Committee what other means of protection you would be prepared to substitute for a wire netting, or lattice, or whatever you choose to call it, or a fry guard, which is different from perforated fry guards three-eighths of an inch?—I would be prepared to substitute none; but there will be evidence given before the Committee suggesting how turbines can be sufficiently protected during the descent of fry without injury to the water-power of the mill.

4238. Are you aware of the character of this evidence?—Yes.

4239. Would it satisfy you?—Do you mean the engineering evidence?

4240. I understand it is proposed to substitute

Mr. Macartney—continued.

something else than a fry guard?—No, they propose to show to the Committee that there are means whereby turbine wheels can be protected, so that the millowner will not be injured, and which will prevent the fry entering a turbine during the spring months.

4241. Without using a fry guard?—No, not without using a fry guard.

4242. Then I must ask you, assuming that the Committee finds itself in this position, that the evidence of the millowners has satisfied it that the erection of a fry guard with $\frac{3}{8}$ ths of an inch mesh is absolutely necessary?—I would prefer you would not say "mesh."

4243. What would you call it. I will adopt any phraseology?—Say aperture.

4244. Supposing there is an aperture of three-eighths of an inch, which you say is absolutely necessary to protect the fry; and, assuming also that the Committee are satisfied that the effect of using any fry guard which is only pierced with apertures of three-eighths of an inch would be to so diminish the power of the water that the effective working of the machinery would be interfered with, is it your view that the application of these fry guards ought to be insisted upon?—Certainly, because before 1863, when these new motors were introduced, the fish were perfectly safe; at least, they were not perfectly safe; but generally they were pretty safe; fry were not injured in the slightest degree.

4245. Then do you disagree with the evidence of the Inspector of the Londonderry district, who gave very strong evidence about the destruction to fry caused by the ordinary water wheels?—Excuse me, it was the destruction of salmon he mentioned.

4246. No, fry?—No.

4247. I thought he said something about fry?—No, it was salmon. And, besides, looking at it from a general point of view, salmon cannot exist without water; millowners can exist without water.

4248. Would you point out to me how the millowner is to exist without an effective supply of water in the mill districts, when the effective supply of water is the only thing which induces him to put his mill there?—No, I am not going to point out that to you.

4249. But you say that the millowner can exist without water; the reason *d'être* of these mills being in Antrim is the fact that by using the water power which nature has provided for them they can introduce them into the country districts, and can work their mills there at a profit, is it not?—I am not going to enter into that question; I only say there is another motor; they have steam. I also would controvert your argument. Nature did not provide the water especially for the millowner at all.

4250. But nature did provide the water?—Nature did provide the water certainly.

4251. Having a divine prescience of the existence of conservancy boards and fishery owners in Ireland, I presume?—I do not say so. As I said, I think they can live quite well side by side, and there should be no antagonism between the two at all.

4252. At the present moment are you prepared

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to deny the statement made to the Committee that the only reason these mills exist in the country districts in Ireland and not in the larger English towns, is the fact that the water-power is most material to them?—I am not going to deny that at all.

4273. Then is your position this: that in order to protect the salmon fishery interest it would be absolutely necessary to erect such fry guards as the millowners say will practically close their mills for three months in the year?—That is assuming that the millowners' statement is correct?

4274. Yes. I am only asking you to take the assumption?—I think so, certainly. You have here an article of food produced out of the water.

4275. Not by the conservancy boards or the fishery owners?—No, it is by nature.

4276. You can hardly say that the woollen stuffs and linens are produced entirely by nature?—No, they are not produced by nature; there is a great deal more than that.

Chairman.

4277. You might say there would not be much fish left if it were not for the conservancy boards?—Yes.

Mr. Macartney.

4278. You have said you have no doubt that the mill industry and the salmon industry could live side by side; what is your suggestion to bring that about?—You will have the suggestion of the experts as to that.

4279. I understand from you that your view with regard to the destruction of fry at Mr. Webb's turbine is this: that very few are destroyed there, because practically very few survive the turbines above him and reach his mill?—Very few, I should think.

4280. I understood from Mr. Moles that he had only got dead fry at Mr. Webb's mill and one other, I think. In fact, I think it was salmon that were killed at the other. I think he only gave evidence about Mr. Webb's mill?—I think he only gave evidence about the fry at Mr. Webb's mill.

4281. Have you ever had reports before the conservancy board at Coleraine of the great destruction of fry at other mills?—I do not remember that we have.

4282. With regard to the Bill which has been referred to this Select Committee, I want to ask you what your objection to it is; do you object to Clause 3?—Of course I shall answer you as well as I can upon this, but you must not take me as an expert lawyer.

4283. Quite so?—I do object to Clause 3.

4284. I will not ask you the reason, because, if you are going to call your solicitor, he will probably be able to answer these questions better; why do you object to Clause 4?—There is an exemption in Clause 4: "Or in any way interfere with the effective working power of the mill."

4285. Is that the principal cause why you object to it?—That is one of the objections; but you must not take me as an expert with regard to the interpretation of an Act of Parliament.

O.S.O.

Mr. Macartney—continued.

4286. You are quite right; there is an exemption there?—Then there is "The expense of such board." I object to that.

4287. Your view, then, is that the industry you represent should be allowed to interfere materially with another industry without paying any compensation, is it?—I do not understand you.

4288. You object to that clause on account of the exemption contained in it, do you?—Yes; and I also object to the "expenses of such board"; and I also object to the words, "during such period as may be prescribed." I do not know who it is to be prescribed by. Then there is something about a grating. I do not know what that exactly is. That does not mean a fry guard, I presume.

4289. At the present moment the inspectors of fisheries are the ultimate authority in Ireland, are they not, on all questions?—Not on all questions.

4290. They are on most questions, are they not?—With regard to gratings?

4291. Yes?—I think they are. There are some other questions as to fisheries on which there is an appeal to the Court of Queen's Bench, I think, and also to the Privy Council. However, you had better ask some one more versed in the law than myself about that.

4292. With regard to the powers exercised by the inspectors of fisheries, would you, as a fishery owner, have any objection to seeing the inspector of factories joined with them where there are questions to be decided as between fishery owners and conservancy boards and factories?—I do not think it should be left open to any board to decide the question of putting a guard up at certain periods of the year. I think it should be statutory. In fact, I object to this Bill altogether.

4293. Are you aware that there is no exemption given in the case of turbines?—I am aware of that.

4294. The fishery inspectors cannot grant any exemption, can they?—It is statutory at present.

4295. They have powers to grant exemptions with regard to gratings and other matters, and with regard to the power which they now exercise, and which Parliament, perhaps foolishly, have given them power to exercise; would you be prepared to associate with them, in the exercise of these powers, the inspectors of factories?—I do not think it is necessary, because they grant them most liberally.

4296. Would you object?—As regards the grating clause alone?

4297. As regards any powers they have?—As regards the grating clause alone?

4298. Yes; I am not trying to catch you?—I do not want you to include in that the turbines.

4299. They have no power as to turbines?—Yes.

4300. With regard to the expenses, do you found your objection to Clause 4, where it brings in the question of expense on principle, or what?—I object to it, first of all, as regards expense; and I object to it as regards the principle too.

4301. I understood you to say the question of expense

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expense is a small one?—Not at all; it is a very heavy thing; in a large district, like the Bann, it would become tremendous to the conservancy board; the individual owner would be at a small expense.

4303. Then do you consider the question of expense material?—Very material.

4304. More material than the question of principle?—No; I think they are equally material.

4305. Suppose the expense was not material, would you still adhere to the question of principle, and consider it very material?—Certainly; I think it very material; I consider them both most material.

4306. Can you point out any analogous case in which there is the principle that you are insisting on here, that is that one industry should be called upon to protect another?—It is not exactly one industry protecting another. The fisheries were created by nature, and they were there long before the mills.

4307. The fish certainly were. I quite admit the fish were there by nature, but I do not think the fisheries were?—I meant to say the fish. It was a lapse. As regards that point I should say also that in Scotland the cost of the erection of gratings is thrown on the millowner.

4308. Are you satisfied with the Scotch law?—No, certainly not; neither are the Scotch people.

4309. Are you satisfied with the Scotch law with regard to gratings?—Yes, as regards gratings.

4310. And you would have no objection to seeing it put in force in Ireland, would you?—Not as regards gratings.

4311. You gave some evidence with regard to the decrease in population, and attributed to it the decrease of poaching?—The report shows that in nearly every instance poaching has been decreased.

4312. That is that there are less prosecutions? No, it does not follow that there are less prosecutions; the offences against the fishery laws have decreased.

4313. How do you know that?—From the reports of our bailiffs in the different districts.

4314. Do you think they are absolutely reliable?—I think they are pretty reliable.

4315. According to the evidence before the Committee there appears to be wholesale offences on the Maine?—That is the evidence the millowners gave.

4316. Do you doubt it; supposing your bailiffs said that the fry guards were perpetually up, and that the evidence of a gentleman who came before this Committee proved quite the other thing, which would you believe?—I do not think it is a question for me to say. You are quite sufficiently able to weigh the evidence yourself.

4317. Do you found your belief as to the diminution of poaching upon the fact that your bailiffs have told you that poaching is decreasing?—Yes.

4318. With regard to those resolutions that were passed by the Londonderry Board of Conservators, I suppose they were drawn up before the Conservancy Board met?—As I told you, I was not present at the meeting.

Mr. Macartney—continued.

4319. Had you seen them before?—No, I was abroad.

4320. Was there a full board present?—I do not know anything about that.

4321. Will your solicitor be able to give any information with regard to the preparation of the resolutions?—I daresay he will.

4322. Was he present?—At the board?

4323. Yes?—I should think not.

4324. Will he be able to give you some accurate information about it?—If you will tell me what it is you want I will try and call his attention to it.

4325. I want to know the origin of these resolutions, and how they were passed and what the discussion was. I want to know all I can find out about these resolutions?—Will you put it in words?

4326. Who drew them up, who proposed them, and so on?—You know who proposed them.

4327. Yes; they were proposed by Mr. Alexander; which Mr. Alexander is that?—Mr. Alexander of Caw.

4328. And Mr. William Irwin?—Mr. William Irwin is a millowner.

4329. Are you going to call Mr. Alexander, or Mr. William Irwin?—No.

4330. Copies of these resolutions were sent to Mr. Balfour, and to other Members of Parliament; were they sent to anybody else?—I believe they were sent round to every board in Ireland.

4331. And did all these boards in Ireland adopt these resolutions?—The generality of them did. I think there were some changes made by some boards.

4332. You said that you valued the salmon fishery industry at 600,000 *l.* a year?—I have always understood it to be between 500,000 *l.* and 600,000 *l.*

4333. Will you tell me exactly what you mean by that?—That would be the retail price of all the salmon produced in Ireland.

4334. But where paid?—It is distributed all over the kingdom.

4335. Is it the retail price produced by salmon sold in Manchester, Liverpool, and so on?—You cannot absolutely ascertain it. I can give you the amount of salmon.

Mr. Pockerton.

4336. I think it would be better to stick to the wholesale price?—The total value of salmon and the price realised, was 352,996 *l.* That is salmon sent to the centres of London, Nottingham, Bradford, Manchester, Sheffield, Wolverhampton, Leeds, Liverpool, and Birmingham. This does not include any sent to Glasgow, nor does it include any sent to the other smaller towns in England; and, of course, it does not include the salmon sent to places in Ireland at all.

Mr. Macartney.

4337. I want to deal with your figure of 600,000 *l.*?—I said between 500,000 *l.* and 600,000 *l.*

4338. I believe you are probably fairly right about it. Do you say that represents the value of the salmon sold in England in the market, where it is consumed?—Yes.

4339. Not

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[Continued.]

Mr. Macartney—continued.

4338. Not what is received for it in Ireland?—No.

4339. So that does not represent the value of the salmon industry to Ireland does it, because it includes in it the profit made on them by the English or Scotch dealers?—You have to take the profit off, and you have to take the carriage off.

Mr. Seton-Kerr.

4340. What is your figure of the aggregate sale?—£ 352,986, but this, of course, is the wholesale price, and does not include the consumption in Ireland; nor the shipment to any of the smaller towns in England.

Chairman.

4341. This was the shipment to Liverpool, was it?—No; London, Nottingham, Bradford, Manchester, Sheffield, Wolverhampton, Leeds, Liverpool, and Birmingham.

Mr. Pinkerton.

4342. What is the export?—The number of salmon boxes in 1890 sent to those centres was 59,432 of 150 lbs. each.

Mr. Macartney.

4343. The pecuniary result to Ireland would be considerably less than that, of course?—Yes; but this does not represent the value of all the salmon fishery of Ireland.

4344. The 600,000 £ does not?—Yes, I should think the 600,000 £ does.

4345. That you think would represent the value to Ireland, would it?—That would represent the value to Ireland.

4346. Comparing that with what is paid by the salmon fishery people, for the protection of their interests, I find it is something under 1,000 £ according to the report of last year. The payments under the 10 per cent. management amount to 901 £ 10 s., do they not?—I could not tell you. I think you are wrong from the first questions you asked me. For instance, you put the 10 per cent. down at 95 £ on the Forke.

4347. I have only taken what appears in the report of the inspectors?—But I thought I had explained to you that you must add the amount of the license duty to the 95 £.

4348. That may possibly be, but I do not quite follow you there, because it appears you do not pay your 10 per cent., because your license duty, which is a different charge, frees you from it?—No, the Act says that every fishery shall pay 10 per cent.; but then it says, if you take out license to the amount of 10 per cent. you pay nothing.

4349. That is my point. I have taken the payments, as I say, under the 10 per cent. rule, which, in certain instances, I agree with you, appears to favour the salmon fishery owners; that is, they get off it altogether if their license amount to a certain figure?—But they pay it all the same; they pay the 10 per cent., but in a different way.

4350. Quite so, but they do not pay the 10 per cent.?—They do not pay the license duty, plus 10 per cent. of the valuation.

0.60.

Mr. Macartney—continued.

4351. But they could not fish without a license, could they?—No.

4352. I am dealing with the compulsory payments made under statute which go to the protection of this industry; and according to that it was 901 £ 10 s. last year over the whole of Ireland?—Yes; but I do not agree with you in the point you seem to make there, that it would only be that. The statute says it is to be 10 per cent.; but if you pay your 10 per cent. and the license duty, the statute does not say you are to pay license duty, plus 10 per cent.

4353. Therefore I say that the payments made under this regulation amount to less than 1,000 £ a year?—I have not added it up.

4354. It is so; I have added it up?—I dare say you are quite right. If you would put it that they have paid a certain amount in license duty, and supplement it by the sum of 925 £, then you would put it right.

Chairman.

4355. In Coleraine there was 1,021 £ received and 981 £ 16 s. expended; Londonderry, 658 £ 8 s. 3 d. received, and 1,354 £ 11 s. 8 d. expended; and after a great deal of examination it was shown that the difference was made up by the fishery owners. That is what I understood?—So it is.

4356. In the Ballyshannon district 430 £ was received and 664 £ expended, and the balance made up by the fishery owners?—Quite so.

Mr. Macartney.

4357. I have a particular reason for making this clear, and I will ask you again?—I cannot admit your proposition.

4358. I am not making any proposition. I am not talking about licenses at all. I am discussing the question of licenses altogether. I press this because it is an important point in my view. The amount paid in the Londonderry district on the valuation was 95 £ last year, was it not?—The amount paid on the valuation in the Londonderry district was the amount paid after the licenses for nets, plus 95 £.

4359. Was the amount paid to the poor-law valuation 95 £ or not; or is this account here correct?—It is correct.

4360. I only want to get the fact; you can add up these amounts afterwards. I want to get that last year the payments made by all the conservancy boards on the poor-law valuation for the protection of fisheries, which is a statutory payment they have to make, did not amount to more than 901 £ 10 s.?—I will not admit that at all.

4361. Will you be good enough to supply the Committee with the accounts?—I am not disputing your figures. I take it as correct, but I dispute the way you put it, because it is 900 £, plus the license duty.

4362. I am saying that the accounts furnished by the inspectors of fisheries show that the percentage on the poor-law valuation did not amount to more than 90 £ 10 s.?—I do not admit that at all.

4363. Is it not the fact?—No, it is not the fact, because you must add to that the license duty.

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4364. I will

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Mr. MOORE.

[Continued.]

Mr. Macartney—continued.

4364. I will go to that question directly. There is a particular item of the per-centage on poor-law valuation, and that is debited, and the total of those payments come to 901 £ 10 s. ?

—Quite right.

4365. In addition, you say that the total payments would be greater, if it were not for the fact that fishery owners are allowed to escape the payment of the full 10 per cent, because they pay a certain amount for licenses; that is your position, is it not?—I think the word "escape" is scarcely a correct word to use. The law says they shall pay 10 per cent. on the valuation, and they do pay it.

4366. But they do not?—Excuse me, they do.

4367. Is it not entered in the account here?—No, it is not entered as 10 per cent.

4368. Then how do they pay it?—Because, for instance, in the Ballyshannon district, the 108 £ represents more than 10 per cent. on the valuation.

4369. How do they pay that?—In license duty.

4370. But why should you put down as a payment on poor-law valuation a payment which is entered as payment for licenses?—Because that is the way it is done. The Act states that you shall pay 10 per cent. on your valuation; but it says if you pay, as for instance, in the Ballyshannon district, 108 £, which is more than your 10 per cent. on the valuation, you shall pay no more.

4371. That is, you escape the payment of the full 10 per cent. if you pay a certain amount for licenses; do you not?—I do not think you escape it. I cannot admit that.

Chairman.

4372. You substitute one for the other; that is the proper way to put it, you say?—Yes.

Mr. Macartney.

4373. Anyhow, you do not pay it, do you?—Yes, we do pay it.

Chairman.

4374. It is clear that you pay the amount either in duty or in per-centage?—Yes.

Mr. Macartney.

4375. You said the amount of fish in the Bann had decreased by half in the last 12 years?—No; I said that taking 12 years, and comparing the last six with the previous six years, the diminution is exactly one-half.

4376. How did you arrive at that?—From my accounts; it is exactly one-half, excepting that there are one hundred and ninety-six fish spread over six years.

4377. Are you inclined to insist upon your view that the population of these districts has decreased?—No; that is not what I said, I think. I think I said that poaching had decreased, because the population had decreased. I think that is what I said.

4378. Are you inclined to insist on that statement with regard to County Antrim?—I did not allude to County Antrim. I alluded to the whole of Ireland.

4379. I am talking now about Coleraine?—I am not prepared to say whether it has decreased or increased in that district.

Mr. Pinkerton.

4380. I see by your evidence, that you were present at experiments carried on by Mr. McDermott?—Excuse me, you have misunderstood me. If that is the way my evidence is printed, it is not so; I was not present.

4381. Then you are not aware that how Mr. McDermott carried out those experiments of passing the fry through the turbine wheel?—I have his letter.

4382. I do not attach much importance to that. Have you any idea of the method in which that experiment was carried out?—None at all; I was not present.

4383. You do not know how he handled the fry, or whether he squeezed them before he put them into the turbine or not?—I am sure he did not do that.

4384. He handled them gently, did he?—Yes; he is in the habit of handling fish, and I am quite sure he did not squeeze them.

4385. In your evidence you state that the method of capture at Coleraine is the same now as it has been since the time of Henry II.?—Yes, virtually.

4386. And at the present moment you have no power to spread nets across the river, have you?—Yes.

4387. Is that method still carried on?—Yes, it is. There was a very long trial about it, and that net was proved back to Henry II.

4388. At many places in the River Bann, have you the right to stretch nets across the entire stream?—It is not virtually across the entire stream, but it is very nearly. It is so at Cransha, and that net fishes about fifty hours a week.

4389. At any other place?—No.

4390. Is not that prejudicial to the salmon; does not that prevent them going up to spawn?—Of course it does; any net prevents salmon going up.

4391. You spoke about a fish-pass that you had constructed at Maguire's Bridge?—Yes.

4392. Would it not be possible to construct similar passes on the Bann, without interfering materially with the flow of the water?—You cannot get the water into it.

4393. You described it as a dam below a dam?—Yes, but they do not happen to take all the water at Maguire's Bridge.

4394. Would not that be an excellent plan?—Yes, if you had the water.

4395. But supposing you have stagnant ponds, one higher than the other, a small trickle of water would serve your purpose, would it not?—Yes, but you cannot even get that, because at all these mills the water is generally below the top of the weir. There is no water flowing over the weirs in dry weather at all.

4396. But suppose your dams remained full all the time?—But you must have some water going out.

4397. And a mere trickle would serve your purpose, would it not?—But you cannot get the mere trickle. I think that there could be invented an automatic fish-pass, say, that might work, which would open in times of flood on weirs. I should think there could be something of the kind invented, but I am not prepared to say.

4398. You

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[Continued.]

Mr. Pinkerton—continued.

4398. You are acquainted with all the tributaries of the Bann, are you?—No.

4399. Do you know the Givay?—No.

4400. Do you know what is called Barclay's weir?—Yes.

4401. Did you ever see salmon above that weir?—I never saw salmon myself above it. I took a house specially there, and I had four men, I think, living there every year in order to protect the salmon at that weir.

4402. Do you know Mr. Robinson's mill?—No; I do not know the Givay above Mr. Barclay's mill.

4403. I suppose you are aware from some of your inspectors that Mr. Robinson is compelled to erect a fry-guard for non-existing fry? According to your evidence, salmon do not go above Mr. Barclay's weir?—I have not given such evidence. If I did I did not intend to. I gave you evidence that we kept four men to protect the salmon crossing Mr. Barclay's weir year after year. We had a house there which has been smashed over and over again.

4404. You spoke of the benefit to Ireland in regard to the food supply. What percentage of the people of Ireland get the benefit of salmon as a means of food?—I may tell you that if they do not get it as a means of food they get it from the distribution of the money coming into the country.

4405. Do you imagine that one per cent. of the people of Ireland ever taste salmon?—It is a matter I never considered.

4406. Do you imagine one in a thousand do?—I could not answer such a question, for I have never considered it. I will tell you what I do think, if you take it for granted now, as you put it, that one in a thousand taste salmon; if you allow these turbidities to exist one in five thousand will not taste it, because the supply will be so much diminished.

4407. That will not make much difference to those who have never had an opportunity of tasting it, will it?—No, but it will make a difference to the others who have.

4408. Your evidence was rather of a sweeping character. According to your evidence the rivers were created entirely for the benefit of the fishery owners and the fish, and not for outsiders?—Excuse me, I wish to correct myself there. I said they were not created for the benefit of one industry alone, but that the fish were in the rivers before the mills existed.

4409. I do not to put any false construction on your evidence at all?—It was a mistake my using the word "fishery," I should have used the word "fish."

4410. You are most anxious to safeguard both industries as far as possible, I suppose?—Certainly; I should like the mills to increase very much because they are most beneficial; in fact I know they are most beneficial to the country, but I do not wish the extension of mills to lead to the destruction of salmon.

4411. According to your evidence I may take the wholesale price of the salmon at about 400,000 £; 354,000 £ export price, and say that the balance of 50,000 £ would be consumed in Ireland, and that would represent a total of about 400,000, would it not?—Yes.

4412. Do you think it would be a very serious loss?

Mr. Pinkerton—continued.

burden on the fishery owners to charge them one per cent. on the gross earnings, to protect the fisheries and by erecting those gratings?—I think it would be a very wrong charge to put on the fishery owners when the millowners, for their own advantage for the last 20 or 30 years, have introduced new motors, which have given them from 25 to 40 per cent. more power, and that those new motors are absolutely destructive to fish.

4413. But you are prepared to admit that the new motors can do with less water than the old bucket wheels, are you not?—Do not take me as an expert in that, because I do not know.

4414. If you require surplus water for the purpose of making fish-passes, it will be better for your purposes to have these new motors, will it not?—I think I cannot admit that. I do not know whether they take less water or not.

4415. You also had an opportunity of hearing the evidence that a new motor gives a steadier drive even than steam, had you not?—Yes.

4416. I am sure you have no desire to see Irish millowners handicapped by compelling them to work with the old exploded methods that have been found inadequate for their purposes, have you?—Certainly not.

4417. You are not satisfied you say with the English law with regard to these safeguards?—No; neither are the English people themselves who are interested in fisheries. The report of the inspectors on English fisheries speaks of the destruction of fry by turbine wheels, and besides that, I think in the Severn you will see there is a considerable decrease in salmon, and the English fisheries are not at all of the same value as the Irish salmon fisheries.

4418. I have not your figures; how many men did you say were employed in the salmon fishery during the three months of the year?—Where?

4419. In Ireland?—I do not know. I think Sir Thomas Brassey can give you that; I think I had a letter from him (but do not, please, take this as certain) saying there were between 10,000 and 14,000 employed; but he will give you that information a great deal better than I can.

4420. I suppose you have no idea of the number of heads employed in those mills affected by your restrictions, have you?—It is not my restrictions.

4421. Are you aware that a more serious injury would be inflicted on a greater number of men by placing any restrictions on the millowners than would be done by interfering with the salmon fishery?—No; I am not aware that anything of the kind would take place, because I believe, as I have told you before, the two industries can live side by side. There is no reason why the millowners should crush the fisheries out of existence.

4422. Then I have only one other question to ask you. Are you prepared, by way of compromise to contribute your quota to the erection of these safeguards?—No; I think the millowner should put up the safeguard himself. He has come there and put up a destructive engine, and I think he should protect that engine.

4423. The man who absolutely derives no benefit from the salmon fishery is to be put to the entire cost, you say?—It is not a question whether

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[Continued.]

Mr. Pickerton—continued.

whether he derives benefit or not. He should not derive benefit to destruction of other people.

4424. That is a capital idea. Then, according to that statement, the fishery-owner should not derive benefit to the destruction of other industries, should he?—As I have told you before, the millowner is a great deal later introduction than fish; and when he had the bucket wheel he virtually did not do any great damage to the fisheries, but the turbine wheel, which has been a new introduction of the last 30 years, is most destructive, I believe, to the fisheries of Ireland. I think, therefore, the millowner should be bound to protect that turbine wheel. And if there were any other means (and there may be other means introduced which may be still more destructive, for all I know, to the fisheries) I think the people introducing these destructive engines should work them under such protection that they do not injure the fish of Ireland.

4425. In your opinion, the pollution of rivers is only a minor matter, is it?—No, my opinion is not that it is a minor matter; my opinion is that it is very material and a very injurious thing.

4426. Would it not be better if your inspectors devoted more attention to preventing the pollution of the rivers, and less to the watching for poaching, and so on?—I think there would be little use in devoting attention to the pollution of the rivers, and having the rivers filled with salmon, when they would be simply destroyed by turbines. It is no use introducing salmon into a river where turbines exist.

4427. Have you ever been present at any experiment carried out with regard to passing fry through a turbine?—Never.

4428. I got a letter from a millowner the other day, and a very eminent engineer, and he saw an experiment carried out about a week ago, where a considerable number of fry were passed through a turbine wheel, and not one of them injured?—Yes.

4429. Are you surprised to hear that after Mr. McDermott's experiment?—Yes.

4430. Did he pass fry through it?—Yes.

4431. Are you sure?—Yes, he caught the fry and passed them through.

4432. Yes?—How many did he pass through?

4433. I do not know with regard to the number, but there were none killed. He put a net at the tail-race, and caught all the fry after passing through?—I am very much surprised at it.

4434. You have heard evidence, have you not, with regard to the different kinds of turbines. Of course, one variety of turbine might inflict a greater amount of damage on fry than another, might it not?—I heard, as I said in answer to Mr. Macartney, Mr. Cadle say that he did not think that the Leeds turbine killed fry; but he pointed out to two or three others, and said: "I would not like to say fry would pass through them."

4435. Did you see the turnip produced here by one of the millowners?—Yes, I saw it. I think if he had passed something alive instead of dumplings through, it would have been more satisfactory.

4436. You are not prepared to go out of your

Mr. Pickerton—continued.

way a single inch in the way of compromise in this matter, are you?—No, I think that the law should stand as it is.

4437. But you know that the law has been disregarded, according to the evidence?—It has been disregarded as far as that fry guard which is in the room is concerned, according to the evidence that I have heard.

4438. Do you intend to give evidence with regard to the different methods of guards that do not interfere with the flow of water?—So the engineers tell me.

Mr. Seton-Karr.

4439. With regard to these fry experiments by Mr. McDermott, could you, do you think, hand in later a written description of them?—I have it here.

4440. Would you mind handing it to me? Is this what is written here all you know about it?—That is all I know about it.

4441. I do not gather that he handled the fry at all before he put them into the turbine?—He does not say so.

4442. You were asked about fish-passes, is that fish-pass at Belleek by the iron flood gates a good kind of fish-pass?—Yes, now it works pretty well.

4443. In your opinion is it a proper kind of fish-pass?—Yes, it works very well, but Belleek is in a peculiar situation; when the gates are opened the fish pass under the gates when they are clear.

4444. So that in a place like that you would not require such a good, well-arranged fish-pass as you would on a weir?—I believe the fish-pass at Belleek is very good when the gates are shut. It had to be doubled because of the rush of water. It was designed first of all by Mr. Gray, and it was not at all satisfactory. There was too great a rush of water; the fish could not ascend at all, so it had to be doubled. I am not suggesting the fish-pass is at all a bad one. I am only saying how that is a place like that, where the fish very often can run through the open gates, it is not necessary to have such a good fish-pass as it would be at a permanent weir. Of course the gates are only open at certain periods.

4445. Mr. Macartney asked you if supposing a three-eighths of an inch fry-guard, without getting dirty like that one we have here, stopped the flow of the water so as to interfere with the effective working of a mill, would you still desire or insist on having those fry-guards erected in front of a turbine? Now I want to ask you this: you do not admit, do you, that a three-eighths of an inch fry-guard would interfere with the flow of water?—Indeed, I do not know.

4446. You do not admit it, do you?—No, I do not admit it, of course. I have a letter from Sir Thomas Brady, in which he says he had seen Mr. Cadle, and he spoke of a circular guard, which he said the turbines could work with, and he believed they would not interfere with them at all.

4447. You can express your opinion perfectly freely, and we take it for what it is worth. We know

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Mr. Seton Karr—continued.

know you are not an expert with regard to the working of a mill or anything of the kind, but you think that fry-guards or submerged guards could easily be erected which would not interfere with the effective working of a mill, do you not?—I should think so.

4448. The protection of turbines seems to be the knotty point. Now in the case of protection of turbines, would you be willing to submit the question of what kind of fry-guard should be adopted to a committee or board, equally representative of the fishery-owners, the millowners, and the Government fishery inspectors?—Certainly, those interested in fisheries only want protection; they do not want to inconvenience millowners in any way.

4449. You are only too anxious to have some fry-guard adopted which would suit both parties, are you not?—Certainly.

4450. You do not want to insist on a fry-guard being put down that would interfere with the working of a mill?—Certainly not.

4451. Do you think it would be a satisfactory way of solving the difficulty, that the question of what kind of fry-guard should be put in front of a mill should be submitted to a board of men equally representing the millowners, the fishery-owners, and the Government inspectors?—I should think there would be a certain amount of guidance to this Committee to show them there can be protection put up which would answer both purposes. The millowner must protect his turbine for his own sake.

4452. He must have some kind of grating, must he?—He must have some protection, as I understand turbines at present. I do not know, if a new turbine comes in, if it will be necessary to erect a guard. I also think there should be, as I have told you before, a bye-wash, because the whole state of affairs where you have turbines is altered from what it was when you had bucket-wheels. The fry passed over the bucket-wheel; and when they now get down to a turbine they are virtually caught in a trap, and they cannot get out at all unless you have a bye-wash.

Mr. Tomlinson.

4453. Do you think the old bucket-wheel safe for fry?—Yes.

Mr. Seton Karr.

4454. In that case it would be better to have a fry-guard at the head of the head-race for the first three months, would it not?—Of course it would be; so that the fry should not be admitted into the mill works at all.

4455. Then you would not require a bye-wash in that case?—No, not at all.

4456. In fact, it would save the expense of making a bye-wash?—It would, certainly, so far as the fish are concerned.

4457. I suppose the requirements for the protection of the mill would vary a great deal under different circumstances. For instance, take Mr. Webb's mill, for the matter of argument. You might require a certain amount of protection there, owing to the formation of the mill-race, and the situation of the mill, and in another district a totally different kind of fry-guard, possibly, 0.80.

Mr. Seton Karr—continued.

would be sufficient?—It may be so. These mill-leads come off in very different ways. Some are in the direct course of the river, and others, they come off at an angle where fry are not likely to enter.

4458. You, as a fishery owner, and representing a large district, do not want to insist on one particular kind of fry-guard being universally used, do you?—Not at all, we only want the fry protected.

4459. With regard to the Six-mile Water, I think you said you took your information in good part from Mr. Moles?—Yes.

4460. But you also know it yourself, do you not?—Yes.

4461. Do you know, as a fact, that there are eight turbines on it?—I know there are turbines on it, but I did not know how many until I wrote to Mr. Moles to send me the exact number that was on it.

4462. He told you there were eight, did he not?—There are eight, and two of those are Hercules turbines, the same as Mr. McDermott tried the experiment with.

4463. And I suppose you are confident Mr. Moles is correct?—I have no reason to doubt him in any way. I know there was a doubt thrown on Mr. Moles's evidence before the Recorder of Belfast, but it was not on that point at all that the Recorder decided; it was because there was not expert evidence before him to show that the turbines were liable to kill fry.

4464. It was a technicality of the Act of Parliament?—Yes.

Mr. Macartney.

4465. He did not state that in his judgment, did he?—I think so; I think that is virtually what he said. I do not think he threw any doubt on Mr. Moles's evidence.

4466. I do not say he threw any doubt on Mr. Moles's evidence; but did he state what you said just now; I have not seen it in any report?—It is a difficult thing to remember a judgment without having it written before you; but, so far as I remember, he said there was no expert evidence to show him that fry going through a turbine would be killed.

4467. And apparently he was not satisfied with the evidence upon the facts, was he?—No.

4468. That would be the natural conclusion one would draw?—One may conclude that; but I only know that that is, as well as I can remember, what he said.

Mr. Seton Karr.

4469. You are only speaking from your recollection of reading the account?—That is all; I think you can have a report of that before you, if you think it desirable.

4470. To come back to the question of the Six-mile Water, Mr. Macartney suggested in one of his questions that the Six-mile Water never was a salmon-breeding river?—Yes.

4471. Do you agree with that?—I do not know of my own individual knowledge.

4472. But you have always understood, have you
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[Continued.]

Mr. Seton Karr—continued.

you not, that it was in times gone by a good salmon-breeding river?—Certainly, always.

4473. Mr. Moles, in his evidence, question 2184, says, "The Six-mile Water some years ago was a splendid breeding river for salmon"; do you know that Mr. Moles is thoroughly well acquainted with the Six-mile Water?—Yes; he has been a considerable number of years inspector.

4474. Would you be quite willing to have your fifth as to the Six-mile Water on Mr. Moles's statement?—Certainly; I have no reason to doubt anything Mr. Moles has ever told me.

4475. Do you think that three-eighths of an inch is the largest size of fry-guard that possibly could be admitted in order to protect the fry?—Certainly; all over Ireland. The fry vary in size, as you have had it stated; and even in the same river they vary in size. In the Erne there is a great variation in the size of fry.

4476. I have just measured, in company with one of the engineers here, the apertures in that fry-guard, where it is clear from wool, and it is rather under three-eighths of an inch; it is three-eighths of an inch square, including the thickness of the wire, but I suppose you do not insist on that particular measure. Where the fry is larger in other parts of Ireland it would be quite competent to have a larger fry-guard than that, which would be ample protection to fry, would it not?—As I have told you I believe that fry are in every river of various sizes, and I think that three-eighths of an inch is the largest aperture that should be allowed.

4477. You think that, generally speaking, it should not be larger, do you?—Yes, I speak generally altogether.

4478. Your solicitor is coming, I believe, is he not?—Yes.

4479. Is he thoroughly conversant with all the legal aspects of the Bill?—Yes, he is.

4480. Mr. Macartney asked you one or two questions about your objections to the Bill, I suppose what you chiefly object to is that in section three the two sections on which at the present moment you rely are entirely repealed?—Yes, that is so. Section three, as far as I can see, repeals the turbine section altogether.

4481. And do you, as a fishery owner, consider, subject to the legal advice of your solicitor, that these two sections being repealed your chief safe-guards are taken away?—Certainly. Section four, too, repeals what is generally known as the Ashworth clause, as far as I can see.

4482. What is that?—It is the exemption clause for putting up gratings, 32 & 33 Vict.

4483. That is section 3 is it not?—Yes, it is section 3.

4484. It repeals the turbine clause, does it not?—Yes.

Mr. Macartney.

4485. Can you tell the Committee why it was called the Ashworth Clause?—Because I believe it was Mr. Ashworth who was the proprietor of the Galway fishery, who, finding the difficulty of protecting the fish at mill-races and mill wheels, urged the Government to introduce some clause of that kind.

Mr. Seton Karr.

4486. Then you strongly object, do you not, to that turbine clause being repealed?—Yes, I object to both the clauses being repealed.

4487. To come to section 4; of course you will notice that it says, "Nothing herein contained shall affect the liability of any person to place and maintain a grating or gratings across any artificial channel under the provisions of the 76th section of the Act 5th & 6th Vict., cap. 106." In the first place I understand that you, as a practical fishery-owner, object to the word "grating" standing there alone; is that so?—Yes; certainly.

4488. In other words, you distinguish between a grating and a fry-guard?—Yes.

4489. And in order to make any clause complete which deals with the question of gratings, the word "fry-guard" should also be included, you think?—Yes.

4490. Otherwise, I suppose you, as a fishery-owner, would be placed at a great disadvantage because the practical construction of that would be that fry-guards would not be noticed at all?—That would be so, I believe.

Mr. Macartney.

4491. But you do not insist upon that evidence as an expert upon the construction of these Bills, do you?—I hope not.

Mr. Seton Karr.

4492. Have you by any chance read the Act of 1842, or had the effect of it explained to you?—Yes, I have some knowledge of the Act of 1842.

4493. I suppose you are aware that for all practical purposes the Act of 1842 by itself does not place any obligation on mill-owners to protect their mills, and that it alludes only to sluices for the purpose of conveying water for the supply of towns, and the irrigation of lands, and that it excepts from the operation of the Act the races for mills?—Yes, that is so.

4494. You are quite aware of that, are you?—Yes, that is so; and the Act of 32 & 33 Vict. was introduced in order to remedy that defect.

4495. That is the Act of 1869, is it not?—Yes.

4496. Therefore you quite realise that in Clause 4 the words "Provided always, that nothing herein contained shall affect the liability of any person to place and maintain a grating or gratings across any artificial channel under the provisions of the 76th Section of the Act 5th and 6th Victoria." That is, the Act of 1842 practically means nothing at all, because the Act of 1842 does not apply to mills, does it?—No, it does not.

4497. Therefore, as a matter of fact, that exception there is entirely superfluous and misleading, and you quite recognise the practical effect of that clause drawn in that way, do you not? I want to know if you, as a fishery owner, rest your objection to that clause on that understanding of it?—I am quite aware that the Act of 1842 was inoperative as far as putting gratings up at mills is concerned, and I am quite aware it was necessary, therefore, to introduce 32 and 33 Victoria in order to render it effective.

4498. Therefore, an Act which repeals 32 and 33 Victoria you object to?—Yes, it throws you back into the same position you were in before. Then the Act would become thoroughly inoperative,

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Mr. MOORE.

[Continued.]

Mr. Seton-Karr—continued.

operative, and the Irish fisheries would be placed then in a great deal worse position than the Scotch fisheries.

4499. And one of your main objections to Clause 4 is, is it not, that it apparently throws you back on the provisions of the Act of 1842, which are inoperative as far as mills are concerned, and therefore gives you, a fishery owner, no safeguards at all?—No safeguard at all.

4500. That is one of the main grounds of your objection to Clause 4, is it?—That is so.

4501. Of course you only speak as a fishery owner, and you do not speak as a lawyer on that point, do you?—Quite so.

Mr. Macartney.

4502. Would you be prepared to accept the turbine clause in the Act of 1893, with a proviso relative to the effective working of machinery attached to it?—No, certainly not.

4503. With regard to the last question just put to you on the Act of 32 & 33 Vict., is it your view that the Act of 32 & 33 Vict. was introduced to remedy certain omissions which you say were in the Act of 1842?—I believe so.

Mr. RICHARD HASSARD, called in; and Examined.

Mr. Seton-Karr.

4507. I BELIEVE you are a civil engineer of large experience in hydraulic engineering?—Yes.

4508. You are familiar with the application of water to motive power for mills and other purposes, are you?—Yes.

4509. Are you also acquainted with the habits of salmon?—Tolerably well.

4510. Have you made it somewhat of a study?—Yes; I fished a good deal in my early life, and am pretty well acquainted with the habits of migratory fish.

4511. And you are thoroughly well acquainted with the mechanism and setting up of turbine wheels, are you not?—Yes.

4512. As an expert, would you shortly describe to the Committee the variety of modern turbine wheels and their action?—There are several kinds of turbines, but the action is the same in all. It is a revolving wheel revolving with rapidity, due, of course, to the height of the fall, and revolving close against fixed vanes.

4513. Have you a model of a turbine here?—I have a model of a vortex turbine.

Mr. Tomlinson.

4514. Is that the one you are describing?—There are some with an inward, some with an outward, and some with a downward flow; but the principle is the same in all.

Mr. Seton-Karr.

4515. I want you to explain to the Committee what is the general principle of turbines, and the velocity of the water, and how they work, so that the Committee can form some idea of the way in which the water goes through them?—This (producing a drawing) represents a portion of a turbine wheel in use on the Thames at Windsor. This is an outward-flow turbine.

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Mr. Macartney—continued.

4504. Do you know that when the Act was introduced into the House of Commons that Clause 4, which is the exemption clause, was not in it, and was introduced merely for the purpose of transferring certain powers exercised by one body of officials to another body?—No, I do not know it.

4505. That is a fact, I may tell you, and that Clause did not exist in it. I have endeavoured to trace where it came in, and I do not know how it originated. There is no trace in the Journals of the House of that Clause ever having been inserted in Committee, except that the Bill was amended in Committee. So that it was introduced by the Attorney General of the day, and there was no intention expressed in the speech which he made to the House of introducing that Clause?—I think it was the late Mr. John Bright who introduced it.

4506. No, it was the Attorney General; it was a Government Bill, and suddenly, in some unexplained way in its passage through the House of Commons, without any debate, this Clause was inserted?—That I know nothing about.

Mr. Macartney.

4516. What is the name of the turbine?—This is a Foamoyron.

Mr. Seton-Karr.

4517. Is it a modern kind of turbine?—It is one invented 80 years ago, but the principle is the same in all. These represent the guide vanes; these are the vanes of the wheel; the water is introduced so, and this revolves in that direction, and the water comes rushing down there. As the wheel passes each of these fixed vanes there is a clearance only of three-eighths of an inch.

4518. What is the distance between each vane of the wheels?—This is a full-sized turbine, and is an unusually large one, but sometimes there are only an inch-and-a-half in size.

4519. I should like you to direct the attention of the Committee chiefly to the modern turbines, the Hercules for instance, to give us some idea of exactly how they work. Do they differ much in principle from the old-fashioned principle?—No, except that the wheel is actuated by the water rushing inwards or outwards, and they all pass closely to the buckets. The space between the outside of the buckets and fixed vanes is never more than three-eighths of an inch.

4520. What is the clearance between the top of the casing and the bottom of the casing; would it be possible, for instance, for fry to go over the top or underneath?—No; when once he gets into the casing he could only pass out of it by going through the turbine; he must go through the turbine. Here (producing another drawing) is an instance of a Lefell turbine; in this particular one there are two wheels. These are the guide vanes; the wheel revolves inside them vertically. This one which I have already shown you revolves horizontally,

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but

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Mr. HASSARD.

[Continued.]

Mr. Seton-Karr—continued.

but the principle is the same in all. The space is not more than three-eighths or a quarter-of-an-inch between the fixed vanes and the revolving wheel.

4521. There is no difference between the old turbine and the modern turbine as regards the clearance, is there?—No, absolutely none. Here is another class of turbine very much used in the north of Ireland (*producing another drawing*).

4522. Will you explain its action and the course of the water?—This is an instance of a standard turbine, which is an American turbine introduced into this country during the last four or five years. The tube leading the water down to the turbine is bolted on to that. This is the fixed case, and the wheel revolves inside that. In fact, it is very similar to the action of a mowing machine. The water rushes down here, and is directed by these fixed vanes against that wheel which revolves inside.

4523. Where does the water come out after it has done its work?—Down below.

4524. Then any fish going down the pipe must get inside that revolving wheel and come down here?—Yes.

4525. That is the only way he has of getting out?—The only way possible.

4526. What is this model?—This is a vortex turbine.

4527. Will you kindly explain how it works?—I will take Mr. Dismore's turbine as an example. He said his turbine had a fall of 25 feet. I forgot what diameter he said it was, but I took it down at the time, and I calculated what the velocity of the water entering that turbine must be; and it was about 35 feet per second. The theoretical velocity being 40 feet per second. A fish getting into that turbine would be shot into it with a velocity of 30 feet per second.

4528. Then, in other words, looking at the model, the top aperture being the supply pipe, a fish, taking an ordinary case, would be shot down that pipe on to the top of that wheel at the rate of 30 feet per second?—Yes; he would then be passed through the wheel at a velocity of 28 feet per second.

4529. That is the only way he has of getting through, is it?—The only possible way.

Chairman.

4530. Just describe the fact that the wheel is in a case, and that there is only three-eighths of an inch between the flange of the wheel and the case, because that is important?—It is, practically, that. The vanes are fixed in the case; the fixed guides or vanes which form part of the case are fixed in it, and between that and the revolving wheel there is a space only of from a quarter to three-eighths of an inch.

Mr. Seton-Karr.

4531. Looking at that model in front of us, put your finger on the spot where the clearance is only three-eighths of an inch?—Between that and the vane which is fixed, and which guides the water into it (*describing*).

4532. You have taken a very ordinary case, have you?—There are not many falls higher than that in that particular part of Ireland, but

Mr. Seton-Karr—continued.

turbines do work up to a very great fall, indeed. For instance, there was a discussion at the Institution of Engineers not very long since, in which a turbine was represented as working under a head of 1,500 feet.

4533. Taking a moderate case, what is the minimum fall?—A minimum fall for a turbine would be about 3 feet; that would be the very lowest.

4534. And what would be the velocity of the water entering that supply pipe, with a minimum fall?—At four feet fall it would be about 16 feet per second.

4535. As a fisherman, will you describe to the Committee what risk you think the smolts would run in passing through that turbine?—I do not see how it is possible they could pass through alive.

4536. I suppose they would have to run the risk of being crushed?—They would be shot down at a velocity into Mr. Dismore's turbine, of 30 feet per second.

4537. They would have to run the risk of being crushed against the wheel, would they?—Of being nipped between the revolving vanes and the fixed guides.

4538. That would be first when they were thrown into the wheel?—That is when they enter the wheel; if they escape that they are whirled round at a velocity of 28 feet per second, and then they pass out in this case laterally through that pipe, and get away so (*describing*).

4539. Then even if they escaped the first rush in the turbine they would have to run the risk of being hurled round at the rate of 28 feet a second, would they?—Yes.

4540. What chances do you think as a fisherman, and not as an expert engineer, they would have of getting through that alive?—I do not see how they could possibly get through it alive.

4541. As a matter of fact do you know of any fry having been killed in turbines?—Not personally.

4542. Not by personal observation?—No.

4543. Have you examined the mills and manufactory in the Foyle and Bann Fishery districts?—Yes.

4544. When?—I was occupied from the 17th to the 21st December last, both days inclusive, with Mr. Moore.

4545. What was the object of your visit?—The object was to see how the water-wheels were protected, and as to whether the river as existing would be destructive to fish.

4546. How many mills did you visit?—Thirteen; viz.: Hillmont, Cullybackey, Lisnafallon (Mr. Gibson's mill), Fenaghy, Ballymena, Moorfields, Oldgreen, Greenfield, Templemore, Kildrum, Ballygrooby, Castledawson, and Upperlands; and I prepared a sketch plan of each mill; they are all here, and if there is any information wanted as to any particular mill I can give it in detail.

4547. I will not ask you for that detailed information; perhaps some other Member of the Committee may. At all events you visited and are prepared to give all information about those mills?—Yes.

4548. Are they all turbine wheels?—No, some of

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MR. HASSARD.

[Continued.]

Mr. Selon-Karr—continued.

of them are worked with a bucket wheel, a breast or overshot wheel.

4549. How many were worked with turbines?—I could not tell you at the present moment; but I can tell you by referring to my notes.

4550. You can hand in a statement as to the number of turbine wheels, can you?—Yes. There is no doubt that the bucket wheels will be gradually replaced by turbines.

4551. Of the 13 mills, had any of them turbine wheels, do you think. I only want a general idea; we can go into details afterwards?—Yes, I think so.

4552. Fully half?—Yes, fully half. I should say some of them had turbines and bucket wheels both, in the same mill.

4553. But at least half of them had one turbine, had they not?—At least half of the mills had turbines.

4554. Do you think it possible for fry to go through any of those turbines you visited without being killed?—No, I think it would be impossible.

4555. Practically the action of this turbine is like that of a mowing machine, I suppose?—Yes.

4556. Are salmon fry very delicate, and very easily killed?—Yes, they are very fragile.

4557. Did you hear the evidence of Mr. Robinson, who produced some small pieces of wood and turnip, which he said had been put through a turbine, and had come out with no marks of injury?—I did.

4558. What is your opinion about that?—Certainly the fish would not have come out without any injury, and I do not know what the turbine was, or what class of turbine it was, or what speed it was revolving at.

4559. Taking an ordinary example of a modern turbine, do you think the test is of any value?—No, I do not think the experiment was of any value. It merely showed this, that small pieces of wood can be passed through a turbine without injuring the machine itself.

4560. But you see the point was that the pieces of wood and pieces of turnip, which could be easily indented, came out, apparently, not indented at all. In your mind, what are the reasons for arguing that that was not a good test; would one be that the wood and pieces of turnip would flow with the water?—I did not hear anything about turnips; I only saw the pieces of wood.

4561. They were both produced by the same witness?—I did not see the turnips.

4562. I suppose you, as a fisherman, would argue, would you not, that a piece of wood would merely float with the water, and be carried along with the water, and therefore would be much less liable to be injured than a fish?—A very slight blow upon a piece of wood might not produce an indent, but it would kill a fish.

4563. You say that a blow which would not indent a piece of wood would kill fry?—Certainly.

4564. That is one reason; but, apart from that, is not another reason the fact that a piece of wood cannot swim against the stream, and therefore would not be so liable to be injured by a turbine as a smolt?—I do not think that

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Mr. Selon-Karr—continued.

would make very much difference, for whether it was a smolt or a piece of wood it would be just driven or hurled with the same velocity through the turbine.

4565. Do you think that the effort that a salmon fry could make against the rush of a turbine would be practically nil?—Yes, nil.

4566. But you attach no importance to that, I understand you to say?—No, not as regards its effect upon fish.

4567. And it does not affect your mind in the least degree in your opinion that salmon fry must be killed by a turbine?—It does not alter my opinion in the least.

4568. And you are perfectly confident, I understand, that they cannot get through safely?—Yes.

4569. I think you have described the effect of the velocity in Mr. Dinmore's turbine, have you not?—Yes, I described that just now.

4570. With regard to the protection of turbines, are you prepared to make any suggestions to the Committee as to the best method of protecting a turbine?—Yes.

4571. Without interfering with the effective working of a mill?—Yes.

4572. Would you kindly explain, as clearly as you can, what your idea of that protection should be?—By drawing water from the mill-race or mill-head by a submerged trough. This (producing a sketch) represents a trough that has been in use at Bessbrook factory for many years. That is close to Newry.

4573. Is that one of the tripartites of the Bann?—No, it is a large mill, and I only show this as an illustration of the protection which is used for the turbine there; but at the same time I may tell you that that also represents the class of protection that was issued at Mr. Gihon's mill at Lisnasillan, which is one of those on the Bann. This one which was used at Bessbrook is below the surface. The one Mr. Gihon used was similar to this, rising above the surface, and it is more effective than the one at Bessbrook, because when the leaves get saddened they might be on the top. But the one in use at Lisnasillan is perforated only upon the sides, and it rises above the surface. The leaves and like matter all flow upon the surface of the water, and a man just walks occasionally on the top of the trough, and rakes or skims them off with a net or rake. That has been in use there for twenty-five years, and the man who was showing us round the mill and works said it answered its purposes perfectly well, and gave them no trouble whatever.

4574. Who erected that?—I do not know.

4575. Have you seen it yourself?—Yes, I have seen it; but I should suggest an improvement upon that, and perforate the bottom plate of that trough.

4576. Underneath, do you mean?—Yes; so that anything that did sink would go to the bottom, and you would get so much more water way for the turbine.

4577. Do you think that protection would interfere in any way with the flow of water, or in any way with the effective working of the mill?—It does not there; the only thing is that

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Mr. HARRARD.

[Continued.]

Mr. Seton-Karr—continued.

if these apertures are made large enough, and there are enough of them.

Mr. Macartney.

4578. How large are those apertures now?—Half-an-inch or five-eighths of an inch.

Mr. Seton-Karr.

4579. They cannot be made any larger, can they, or they would let fry through, I suppose?—They could very safely be made five-eighths, I think.

4580. Mr. Moore thinks that three-eighths of an inch should be the maximum?—Fry remain for a year or two years in the shallow and sheltered water, and do not move about much, but when they begin to move and go down to the sea, they are 4 or 5 inches in length, and are a larger fish.

4581. And you think five-eighths would be a good protection, do you?—I think five-eighths would be a good protection.

4582. What is the size of this particular one, do you say?—At Newry the apertures were either half-an-inch or five eighths, they could not tell me which, but I think they might be safely made five-eighths.

4583. Do you think that would be an ample protection for fry?—I do, ample.

4584. Is there any reason why a protection of that kind should not be utilised at Mr. Webb's mill, say I?—Not the slightest.

4585. And you think it would not affect the working of Mr. Webb's mill, for example, or any other mill of that description, do you?—Certainly not. Mr. Webb has now inclined gratings. All the turbines that are in that district are protected by inclined gratings, set across the mill race in that way, in front of the sluice that leads the water to the turbine.

4586. What mill is this you are speaking of?—I am speaking of the general arrangement.

4587. But Mr. Webb's mill is not protected at all, is it?—Yes, it is protected by inclined gratings.

4588. But he has taken them away, has he not?—They were there when I was there.

4589. When was that?—In December last.

4590. He has given evidence, I think, that he has taken them away?—These bars are three-eighths of an inch apart, and when the leaves and floating matter come down there they lie against the bars, and anything that comes down catches the bars, and is then brought round on each side of the bars, and held in position by the current of water, and they are troublesome, no doubt, soon becoming choked, and requiring constant raking and cleansing; that is, when there is a quantity of leaves and floating matter about.

4591. Why do not the holes of the submerged troughs get choked up in the same way?—They do not, because everything floats on the surface of the water. For instance, in this case, if any floating matter comes down it gets against one of the bars or wires, and then the current sweeps it into the aperture on each side of the bar, and holds it against the bar, but there is nothing of that sort in the perforated troughs for any floating matter to cling to.

Mr. Seton-Karr—continued.

4592. The floating matter would only strike the top of the grating one would think?—It appears to be so.

4593. Will you kindly explain it?—I cannot. I only saw that it appears to be sucked down by the current through the bars.

4594. That action does not apply to a submerged trough, does it?—No.

4595. Do you think that is a bad kind of fry guard?—It is troublesome; I think the submerged trough would be better in every way.

4596. Do you strongly recommend the submerged trough?—Yes.

4597. Did you hear or read the evidence of Colonel Cooper or Mr. Petrie?—No, I was in Ireland at the time.

4598. Do you know of any places where they have vertical fry guards, which are put into runs like window-sashes, and then taken out and cleaned once in every 24 hours?—They have them at Cork, I believe.

4599. Do you know them; are you personally acquainted with them?—No, but I have heard they have them there.

4600. Do you believe the submerged trough you describe would be better than that?—I do not think anything else than a submerged trough would be necessary.

4601. Do you think that would be the best kind?—I do.

4602. You did not read the evidence that Colonel Cooper gave as to fry guards that had been in use for 20 years, and had never been complained of, did you?—No.

Chairman.

4603. As I understood it, a submerged perforated screen was specially objected to by some of the witnesses on the other side?—There was one witness who gave it as his opinion that the holes in a submerged trough would choke up equally with that lattice which has been exhibited here, but he gave it merely as his opinion.

Mr. Seton-Karr.

4604. Do you know of any mill where they have tried that submerged trough, and it has failed?—No.

4605. The only places where it has been tried it has succeeded, has it?—Yes, that is at Newry and Lisnaffillan.

4606. And it has succeeded there perfectly well?—Yes; it is at one of the mills in this Bann district.

4607. And there is no complaint whatever of it?—On the contrary they said it acted perfectly well and gave no trouble.

4608. And both millowner and fishery owner are satisfied with that, I understand?—Yes.

4609. I suppose that the millowner, or whoever is in charge of the submerged troughs, would have to clean them out at certain intervals, and look after them?—Once or twice a day.

4610. It would not require very much labour, you think?—No.

4611. Do you know anything about the circumstances under which that particular fry guard, which has been produced before the Committee, got into such a bad state as we see it?—No, I do not.

4612. You

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Mr. HASSARD.

[Continued.]

Mr. Selous-Kerr—continued.

4612. You know nothing about how that fry guard came to be in such a state?—No.

4613. Have you examined it?—Yes.

4614. Have you formed any opinion about it? It appears to be choked more by some fibrous matter, such as flax refuse, than weeds.

4615. Supposing that that fibrous matter was in a mill race, where a submerged trough such as you described was erected, what would be the result?—It would pass through the holes, without adhering to any part of the trough. There the fibrous matter comes down and gets along round the vertical and horizontal bars, and the current then sweeps a portion through the aperture on each side of the bars, and fixes it there.

4616. And that would not operate in the case of a submerged trough, would it?—Certainly not, because there is nothing for the fibrous matter to cling to.

4617. Then do you mean to say that if at the place, where that fry-guard was taken from, they had had a submerged trough erected in the way you have described to us, the flow of water would not have been interfered with?—It would not have been interfered with.

4618. Are you confident of that?—Quite confident.

4619. I believe that since this Committee sat you have made inquiries as to the efficiency of these submerged troughs from parties who have used them, have you not?—Yes.

4620. Have you received letters from them?—I have made inquiries at Newry, at the Beesbrook mill, which I have mentioned.

4621. Anywhere else?—No.

4622. Have you a letter from them?—Yes, I have two letters here.

4623. Will you kindly read them?—Yes. That (*exhibiting a sketch*) represents the submarine trough at Newry. This letter is from one of the partners in the Beesbrook firm: "Our turbines are protected by cast-iron cases of considerable size into which the water flows through round holes of half-an-inch in diameter (it may perhaps be five-eighths). The united areas of these holes must be in excess of the area of the tube conveying the water. One cannot be too careful about having these cases right. If gratings are used alone, pieces of wood, &c. would get in and serious injury might result. About once in ten or twelve years it is necessary to run a drill through the holes as they rust up a little. It is well to have gratings as well at some distance. The best form is (then is represented the inclined grating such as I showed to the Committee). Of course in dealing with a mountain stream for instance away from trees only the casing would be needed." He means by that that the gratings would not be necessary. Then he wrote again a day or two afterwards: "I have yours of the 25th, and in order to check my own observation with regard to turbine protection plates, I called at the Newry Foundry to ascertain their experience. I saw Mr. Rennie and the foreman of the department, John Macdonald" (who will give evidence here I believe). "Macdonald says in all his experience, which is very 0.80.

Mr. Selous-Kerr—continued.

lengthy and extensive, he has never known a turbine protected by perforated plates to be stopped in consequence of anything having floated into the wheel. He says, and Mr. Rennie agrees with him, that putting aside the question of cost, a perforated plate protection is superior to any other, looked at from a millowner's point of view. He considers the most suitable arrangement is to project the plates forward (that is as on the sketch I have shown V shaped with the apex of the triangle towards the stream). The area of the holes in the plates not to be less than three times the area of the sluice admitting the water into the race, the larger the area of holes in proportion the better. Another suitable form is to project the plate with an inclination of about 30 degrees flat across the race; the stream of water coming forward will always carry small sticks and leaves to the top where they can be very easily removed, the submerged grating projected underneath remaining quite free for the passage of the water. As regards gratings: he has been telegraphed for to go to the King's County, a distance of about 130 miles, where a turbine stopped, and the people of the mill could not ascertain the reason. On going below the wheel he discovered an eel, one portion in the moveable buckets and the other in the fixed. When the eel was cut out the wheel was perfectly free."

4624. Does that mean the eel was cut in half?—I suppose it was not revolving with any great velocity; an eel is of course very tough. Then, "In this case a grating was used of flat iron one-and-a-half by a quarter of an inch set edgewise to the water with one-inch openings, each bar eight feet long with one cross stay in the middle. He considers that the eel sprung the bars sufficiently to get through. Since this time the same wheel has several times been stopped by eels getting in, but the men at the mill remove them themselves."

Chairman.

4625. Have you seen these troughs in action?—Yes, I have seen both of them.

Mr. Selous-Kerr.

4626. Is that all you have to read in the letter?—No; he says, "At Beesbrook the plates give very little trouble to keep clean, even in autumn when the water has many floating leaves, but this may arise from the water being taken direct from a pond and not from the race." At all these mills, in fact there was only one case that was otherwise, the water was taken not direct from the race, but from a pond. This (*producing a sketch*) represents the general arrangement of most of the mills. Here is the weir taking the water off the river or mill-race. Then it is enlarged into a mill-head or pond at the mill, and is then taken off into the wheels or turbines, and this represents such a mill-head with two of these troughs.

4627. Is this an actual or an ideal plan?—No, it is an ideal plan showing the general arrangement of all these mills.

4628. Is that the bye-wash?—Yes.

x 2

4629. Assuming

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Mr. HARRARD.

[Continued.]

Chairman.

4629. Assuming the entrance power through the grating to be equal to the area of this pipe that supplies the turbine, the obstruction of the grating over the fry guard cannot prevent a sufficient supply to the turbine, can it?—If the area of the holes is made sufficiently large, of course it cannot interfere in any way with the supply to the turbine.

4630. How do you account for one of the witnesses saying it would be impossible to get a sufficient supply of water if a certain guard were put up?—They do not appear ever to have tried the submarine troughs, and I can only

Chairman—continued.

account for them saying it by their never having seen them in action.

Mr. Selwin-Kerr.

4631. There would not be the slightest difficulty I suppose in their calculating how many holes would be required, and the area of the holes which would be required in making a trough of proper size?—Of course not; it is simply a matter of arithmetic.

4632. And it does not matter how large that trough is, providing it is constructed in the way you describe, does it?—Not in the least.

Tuesday, 10th May 1892.

MEMBERS PRESENT:

Mr. Cox.
Sir John Whittaker Ellis.
Mr. Horier.
Mr. Macartney.

Mr. Pinkerton.
Mr. Seton-Kerr.
Dr. Tanner.
Mr. Tomlinson.

SIR JOHN WHITTAKER ELLIS, BART., IN THE CHAIR.

Mr. RICHARD HASSARD, re-called; and further Examined.

Mr. Seton-Kerr.

Mr. Seton-Kerr—continued.

4633. You were to furnish the Committee a list of the mills worked by turbines or water-wheels?—Yes; I hand it in. Of the 13 mills two are driven by turbines only, two by bucket-wheels only, and nine partly by bucket-wheels and partly by turbines; the total number of bucket-wheels being 24, and the turbines 14.

(A.)

Appendix A., referred to in Evidence of Mr. Hassard.

Salmon Fisheries (Ireland) Amendment Bill.

STATEMENT of the Number and Class of Motors used at the 13 Mills visited by Mr. Hassard, and referred to in his Evidence.

| Name of Mill | Number of Bucket Wheels. | Number of Turbines. | |
|--------------|--------------------------|---------------------|---|
| Ellenbrook | 2 | 2 | |
| Collybrook | 2 | — | Originally had six bucket-wheels, but five only now in use. |
| Blackfish | 2 | 1 | |
| Fungy | 2 | 1 | |
| Ballymore | — | 1 | |
| Marshall | 2 | 1 | |
| Old Cross | — | 2 | |
| Greenfield | 1 | 1 | |
| Trapsnoyle | 1 | 1 | |
| Kilmore | 1 | 1 | |
| Ballymore | 1 | 2 | |
| Castleman | 1 | — | |
| Upperlands | 4 | 1 | |
| | 24 | 14 | |

Of the above 13 mills, two are driven by turbines only, two by bucket-wheels only, and nine partly by bucket-wheels and partly by turbines; the total number of bucket-wheels being 24, and of turbines 14.

4634. When we finished on Friday you were describing to the Committee the construction of the submerged trough that you recommended as the best fry-guard?—Yes.

4635. Did you read Mr. Webb's evidence?—I have not read his evidence since it has been given; I heard his evidence.

0.80.

4636. Do you remember his saying that perforated plates, somewhat of the kind, I take it, as what you have described in these submarine troughs, would get blocked up as badly as a lattice of that description; do you remember his saying that?—I do.

4637. What is your opinion on that point?—It is quite a misconception.

4638. Can you give the Committee some reason for that?—Mr. Webb, I think, also stated that a submerged trough would be liable to be blocked by ice. When a trough is submerged some foot or so below the surface of the water, it is absolutely impossible that it could be affected by ice at all.

4639. Then with regard to wool, or weeds, or anything of that kind in the water, what do you say?—There is nothing in a submerged trough for fibrous matter, such as is shown on that screen, to cling against. Those bars and meshes that are in that lattice work afford a foothold, as it were, for any fibrous matter coming down. In the case of a submerged trough, if any of that small matter comes down, there is nothing for it to hold on to, or cling to; it is sucked into the hole at once. I think the best proof that can be given of the efficiency of a submerged trough is that Mr. Gibson, one of the millowners in this very district, put down a submerged trough 25 years ago for the protection of his turbine, and he is so satisfied with it that he has continued it in use ever since.

4640. Have you any evidence from any other parties of the same character?—Yes, from the Beahrook Spinning Factory at Newry.

4641. How long have they had a submerged trough there?—To my knowledge it must have been down more than 20 years.

4642. Do you think the modern turbines would be more likely to be interfered with by the existence of submerged troughs than the troughs put up 20 years ago?—I cannot imagine any difference whatever.

4643. With regard to the flow of the water, and the way in which the turbine is worked, as a matter of fact, the turbine, I believe, is worked by the fall of the water down the supply pipe, is it not?—It is worked by the pressure and the velocity

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Mr. HANNAH.

[Continued.]

Mr. Seton-Karr—continued.

velocity of the water issuing from the bottom of the pipe. The velocity and the force of the water are, of course, dependent on the head.

4644. By the head, you mean the fall, do you?—Yes.

4645. Not of the mill-race, but in the supply pipe?—In the supply pipe. The difference of level is a difference of level between the water of the head and the tail races.

4646. I take it, therefore, that the flow in the head-race has nothing whatever to do with the power which works the turbine?—Only so far as this, it conveys the water which works the turbine.

4647. Some millowners have said, I think Mr. Webb, amongst them, that to put a fry-guard down would check the flow of water in the mill-race, and consequently would interfere with the power of water which works the turbine?—No doubt, if such an appliance as that were put across a head-race, it would require the head-race to be considerably enlarged at that spot, otherwise, no doubt, that would interfere with the flow of water.

4648. But, as a matter of fact, it could only interfere with the working of the turbine by bringing the level of the water in the mill-race down below the entrance of the pipe which takes it down to the turbine, could it not?—It would act as an obstruction to the mill-race, and would prevent the same quantity of water passing that would pass if there were no fry-guard there.

4649. What I mean is this: as long as there is plenty of depth of water over the supply pipe, it does not matter how fast that water is flowing; it has nothing whatever to do with the rush of the water, has it?—So long as the water gets to the pipe leading the water to the turbine, it does not matter how it comes.

4650. The power simply depends on the fall, I think you said?—Yes, the quantity of water and the fall.

4651. Is not there a distinction between a turbine and a bucket wheel in that respect. In the case of a bucket wheel or a breast wheel I suppose the rush of the water supplies the power as much as the quantity?—No; it is the weight of the water. In the case of an undershot wheel no doubt the impulse supplies the power, but that no doubt is due to the level in the head. In the case of the overshot wheel, the impulse is lessened as far as possible, and the motive power is provided by the weight of the descending water.

4652. I suppose if a fry-guard is put down and checks the flow of water in the race, it would have more effect in the case of a bucket or breast wheel than in the case of a turbine?—No; it would be the same in both cases. As long as the flow of the water is checked, it would diminish the power no doubt.

4653. How do you reconcile that with the fact that it only requires the fall in the supply pipe to work the turbine?—Whether the motor is a bucket wheel or a turbine the power is dependent on the water brought up the mill-race, and if you obstruct the mill-race in either case of course you diminish the power. A small enlargement of the mill-race at the point where the fry guard, if composed of latching such as that, is put in, would meet the difficulty.

Mr Seton-Karr—continued.

4654. In case a fry-guard of that kind were put up?—Yes. If the fry-guard is a submerged trough, of course no enlargement is necessary.

4655. In that case you say most confidently that the flow of water is not interfered with, do you?—So long as the apertures are made of sufficient area to allow the quantity of water to pass through which is necessary to work the turbine, there is no diminution of power.

4656. And therefore no widening of the mill-race will be required?—And therefore no widening of the mill-race will be required, I might say, excepting it were placed at the very end of the mill-race. There was one case among the 13 mills I examined where a turbine was at the lower end of a mill-race, and there the mill-race would require to be enlarged, something in that manner (producing drawing). In all the other mills the mill-race was enlarged into a mill-head, so that they took their water from a pond.

4657. You want the Committee to understand that these are ideal pictures; they are not pictures of existing mills, are they?—This picture is not a plan of any particular mill, but it represents the mode in which the water is taken.

4658. In putting up any future turbines, and making any new mill-races, that would be the way you would recommend the millowners to make them, I suppose?—That is the way they are now; with that one exception they take from a mill-head, such as I have drawn here. This represents the general principle.

4659. Where you have a straight head-race right down to the turbine, you just have to enlarge it slightly, do you not?—Yes.

4660. As to the cost of these submerged troughs, generally speaking, under ordinary circumstances, what would be the cost of putting up a submerged trough of the kind you have described?—In the case of a trough such as I have sketched there, 12 or 15 feet in length, the weight of iron would be 16 cwt. At 20s. a ton, that would be 16l., and allowing 9l. for the fixing, 25l. would be the outside cost.

4661. £. 25 would be the outside cost, covering everything, you say?—Yes, covering everything. One would be necessary for each turbine, of course.

4662. In other words, the cost is a comparatively small item, is it?—Yes.

4663. With regard to gratings at the head and tail races, have you experience of erecting them?—No. I saw gratings at one or two of the mills, and Mr. Gibson's I especially recollect. By gratings I mean bars with two inches clear space between them to prevent the passage of mature fish. They seemed to me to offer no obstruction whatever to the passage of water.

4664. Can you conceive any reason why the millowners should object to the erection of properly-constructed gratings at the head and tail races?—No, I cannot. Mr. Wilson, in giving his evidence here, said that he advised any parties who put turbines to put nettings across the head-races, an inch and a half in the mesh, I think he said. I think it stands to reason that vertical gratings with bars two inches apart would not be nearly such an obstruction as that.

4665. And

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Mr. HASSARD.

[Continued.]

Mr. Seton-Karr—continued.

4665. And they would be much more easily cleaned, I suppose?—Yes.

4666. They would not interrupt the flow of the water in the least, I suppose?—Not to any appreciable extent.

4667. At all events they would not interfere in the least, in your opinion, with the working of the mill?—Not in the slightest.

4668. Do you know a mill called the Castle-dawson Mill?—Yes.

4669. Have you anything to tell the Committee about how that is worked?—The Castle-dawson Mill is a bucket-wheel mill. The water is taken off the river at a long distance from the mill, and in order to save trouble the millowner neglects to shut the sluice down on Saturday night as he is bound to do, I believe, by the Act. In consequence of that, in moderately dry weather, all the volume of water is diverted into the mill-race; there is none goes over the weir, fish cannot pass up, and the bed of the river is perfectly dry. If he shut down his sluice on Saturday night, and let the water run in the ordinary course of the river during the Sunday, fish would have a chance of passing up, of course.

4670. By leaving his sluice open, he prevents any fish from going up, does he?—He prevents any fish from going up.

4671. Do you speak from your own knowledge in this matter?—I speak from what the millowner told me.

Mr. Timlinson.

4672. Is this a mill on the Main?—It is on a tributary of the Bann; I forget the name of the river, but I can get it if necessary.

Mr. Macartney.

4673. It is in the County Derry, is it not?—Yes, it is near Castledawson.

Mr. Seton-Karr.

4674. Why have no steps been taken by the Conservators or other people to compel him to put his sluice down on Saturday night?—I do not know.

4675. I suppose he inflicts considerable injury on the salmon ascending the river in that way?—Certainly; in dry weather the salmon have no chance of passing up the river at all.

4676. Are they congregated below the dam or in the tail-race?—They congregate in any pools that are left in the bed of the river below the head weir.

4677. Has that particular weir got a fish pass?—It has what is called a fish pass, but it is not a fish pass.

4678. It is not a proper fish pass?—It is of no use at all; it is simply a long slope at the same level as the crest of the weir.

4679. Even if he did shut his sluice down on Saturday night the fish would not have much chance of getting up, would they?—It would depend on the quantity of water in the river.

4680. If there was a good flood of course they could get up?—Yes; but if there was only an inch or two inches of water passing over the weir, of course they could not.

4681. What is your opinion about fish passes; 0.80.

Mr. Seton-Karr—continued.

what kind of fish passes do you think ought to be made in every weir?—There would be no difficulty that I can see in constructing in all those weirs automatic fish passes, so that when there was a surplus of water in the river, and more than the millowner could use, instead of its passing in a thin sheet as it does now over the weirs in such a way that it cannot be used by the fish, and is surplus water to the miller, it could be concentrated in a pass which could be easily arranged to be automatic, say, 4 feet wide and 15 inches deep, and the fish would have a chance of passing up, and would pass up, whereas now they cannot move. Take, for instance, a weir across the river a hundred feet in length, which is a very common length in those rivers, if the water were going two inches over it, that water is all lost to the millowner, but it would amount to 1,450 cubic feet per minute passing down the stream, of which the fish cannot avail themselves.

4682. But if you had an automatic fish pass they could get up with that same quantity of water, could they?—Yes.

4683. Could you describe to the Committee shortly what you mean by an automatic fish pass?—A pass worked by a float, and so arranged that the float would not come into action and raise the sluice, which would give the water access to the fish pass until the level of the water in the river was exactly at the crest of the weir, and when it got immediately below the crest of the weir the sluice would close.

4684. In other words, a fish pass of that kind would not interfere in any way with the miller's water-power, would it?—Not in the slightest degree.

4685. With regard to Mr. Macartney's Bill which is now before the Committee, I believe you have read it?—I glanced over it.

4686. At all events you know what the effect of it is, do you not?—I know the effect of it.

4687. What is your opinion of it?—I think it would be very destructive to the fisheries. Since the Committee met last Friday, I have made a sketch showing what the effect of a turbine wheel would be on salmon fry. This represents Mr. Dinmore's turbine, two feet in diameter. (The Witness handed the sketch to the Committee.)

Mr. Macartney.

4688. This is not taken from life, is it?—It is taken from Mr. Dinmore's own evidence.

4689. It is drawn from your imagination of what might happen, and is not from anything you saw, is it?—Of course not. This is the turbine case; these are the guides by which the water is directed into the turbine; this is the revolving wheel, two feet in diameter. Mr. Dinmore, or Mr. Wilson for him, stated that the turbine revolved with a circumferential velocity of 28 feet per second, and in that he was quite correct. If a fish got into the turbine when the vanes were in that position, he might just have a chance of passing through, but he would not have more than 1-84th part of a second in which to pass into the wheel.

Mr. Seton-Karr.

4690. Otherwise he would be cut in half, would he not?—If he had not passed through, the

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Mr. HASSARD.

[Continued.]

Mr. Seton-Karr—continued.

the vane A, would take the place of the vane B, and he would be jammed up against the next guide if he were not through in 1-84th part of a second.

4691. Supposing he took advantage of the 1-84th part of a second to get through that opening into this, what would happen then?—He would be whirled round for some distance and dropped into the tail-race through that space, that is the space where the tail water goes after working the turbine.

4692. How would he pass out?—Here. Those are the apertures at the back. That only represents the bottom of the case, it does not represent the side. He would come in here and go out so (describing).

4693. He would be whirled round here?—He would be whirled down for some little distance and then dropped into the tail-race.

4694. And the least blow with one of those vanes would be sufficient to kill a delicate fish like a smolt, would it not?—His chance would be very small.

4695. To come back again to Mr. Macartney's Bill, do you think this Bill is uncalculated and unnecessary?—I think it would be most destructive to the fisheries and of no benefit to the mill-owners.

4696. Is it your opinion that, because they could put these submerged troughs up, and therefore effectively protect the fish without interfering with their turbines, the Bill is unnecessary?—I think so. If those troughs were put up, as I think they should be, both millowners and fishery proprietors would have every necessary protection so far as the destruction of fry and the protection of turbines is concerned.

4697. Supposing that any legislation is brought in on the subject, in your opinion, do you think it ought to include legislation with regard to these fish passes?—I think so; I think every weir ought to have a fish pass, where there are migratory fish.

4698. I suppose it is the fact that by the adoption of turbines instead of bucket wheels, the millowners get an increase of water power, varying from 25 to 40 per cent.?—Yes, and a turbine is applicable to any fall.

4699. Is that the advantage they get?—Yes; they get an increased water power of 25 to 40 per cent.

4700. In your opinion is it unjust to allow them to erect dangerous machinery without adequately protecting the fish from it?—I think so.

4701. Are you acquainted with Mr. Webb's mill-race?—Yes.

4702. There was some dispute about the figure which Mr. Webb stated (I will not ask you what the figure was) as the cost of putting up a protective grating there; but what is your estimate of the cost of putting up a protective grating at that particular mill?—Do you mean grating or lattice?

4703. You are well acquainted with that mill, and the mill-race, are you not?—Yes.

4704. At the present moment his turbines are not protected at all, are they?—They were protected when I was there, but the protecting

Mr. Seton-Karr—continued.

gratings were not sufficiently close to prevent the passage of fry.

4705. I think we had evidence that the gratings were generally lying on the bank?—No; I have looked at my notes since you mentioned that on Friday, and the gratings were in place; I saw them there. They were inclined gratings. There was no fry-guard of the kind we have in the room, there, but there were inclined gratings in place, but the bars were not sufficiently close to prevent the passage of the fry.

Mr. Macartney.

4706. Do you mean in front of the turbine or at the head and tail race?—In front of the turbine.

Mr. Seton-Karr.

4707. Quite apart from the question of building any fish pass, about which I am not talking, can you give the Committee what it would cost, in your opinion, to put an efficient fry-guard in front of Mr. Webb's turbine?—A submerged trough would cost 25 £.

4708. Would there be any other expense entailed on Mr. Webb?—None that I can see.

4709. What would it cost him to put gratings at his head and tail races to prevent the passage of mature fish?—I estimate that to put the kind of grating which I should advise, like a lock gate, so that they could be opened and laid against the bank when not in use, would cost 35 £.

4710. Where would those be?—I would put those just behind his sluice, so as to avoid the stoppage of his mill.

4711. How near to his turbine?—This is at the upper end of his tail-race.

Chairman.

4712. Where is the mill?—The mill is a long way down. It is on this side.

4713. So that you would put it inside the sluice?—Just inside, and the object would be to prevent any stoppage of the mill, because if the sluices were shut down and these were put together beforehand, they could be very easily put in place between Saturday night and Monday morning.

Mr. Seton-Karr.

4714. There are gratings at the head of the head race to prevent the passage of mature salmon, are they not?—Yes.

4715. Nothing to do with fry-guards?—No.

Chairman.

4716. Does this apply to Mr. Webb's mill?—This is the dimension of Mr. Webb's head-race.

Mr. Seton-Karr.

4717. And you estimate that that would cost more than 35 £?—No; that is an ample price.

4718. Then if he had lower down a submerged trough, it would cost him another 25 £?—Yes.

4719. That is 60 £?—That is 60 £.

4720. What would it cost him to put a grating at the foot of his tail-race, or would it be necessary?—It would not be necessary in that particular

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Mr. HASSARD.

[Continued.]

Mr. Seton-Karr—continued.

particular case. The tail-race is in dead water, and there is a rapid current in the river where it enters the river.

4721. I see, in reply to Question 120, Mr. Webb says the estimated cost of putting up erections which the Conservators desired him, or called upon him to put up, would be somewhere about 1,400 £?—I think, if I recollect rightly, that he included in that the loss occasioned by the stoppage of his mill during the time that it was being erected.

4722. He must have included a very large amount for that, must he not?—Yes.

4723. He says: "The estimated cost of putting up the erections which they called upon me to put up was somewhere about 1,400 £."—That included the stoppage of his mill, or I understood him to say so. It is obvious that a work of that kind could not cost 1,400 £.

Mr. Pinkerton.

4724. He said there had to be a concrete base built across the river, did he not?—Yes, I am perfectly well aware of what he said.

Mr. Seton-Karr.

4725. In reply to that same question Mr. Webb goes on to say: "It would cost me 1,400 £ out of my own pocket to put up those erections"; surely he does not mean to include any damage to his mill in that?—I made an independent estimate of the same thing.

Chairman.

4726. Mr. O'Neill examined him, and he said: "The putting up of the grating in front, next the River Main, somewhere about 10 feet deep, and of great width, also to put up the nettings, and then to make a very extensive structure in the tail-race. In that case a building would be required to sustain it. I think it is 30 feet wide, and I would have to support the grating, and put solid stonework to build it upon. (Mr. Macartney.) In fact, you had an engineer's estimate as to that, had you not?—(A.) Yes; an engineer gave me a rough estimate of it. I think myself it would have cost more. I mean to say the loss would have cost me that; I should have had to stop my work"—Then the stoppage of the mill is mentioned.

Mr. Pinkerton.

4727. Yes, in excess of the estimate; he said it would cost him more than that?—I did not recollect the exact words; that I thought was the substance of it. I made a sketch and a detailed estimate of what a double fry-guard would cost at the head of the mill-race, and I make it 87 £.

Mr. Seton-Karr.

4728. That is a fry-guard at the head of the mill-race, is it?—Yes, a double fry-guard, suspended so; there is one fry-guard and there is the other one, so that, if this one got clogged, you would take it up to cleanse it, and the other would remain in place.

4729. That would be in place of both the grating and the fry-guard, which is in front of 0.8 £.

Mr. Seton-Karr—continued.

the turbine, would it not?—This would be necessary when the fry were going down, and if a guard of that kind were there the grating would not be necessary, because that would do both for fish and fry going down.

4730. Then when the smolts had done running down to the sea you could take up those lattices, could you not?—Yes, you could lift them up.

4731. And leave the gratings?—The kelts run down at the same time as the smolts, in the spring.

4732. Then do you think that in June no guard of any kind would be required?—No; it could be lifted up, or these gratings might be thrown back against the side of the water-course, so as to leave the mill-race quite free.

4733. And if that were erected there you do not think it would be necessary to have any protection lower down, in the way of a submerged trough, do you?—No, only that it would be required for the protection of the turbine itself.

4734. You say you estimate that would cost 87 £?—Yes; 100 £ would cover it well.

4735. That is not including the grating you mentioned?—No; and not including any stoppage of the mill, because that could be put in between two o'clock on Saturday and Monday morning, if it were all framed and put together on the barge previously.

4736. Then the erection of these lattices would not stop his mill at all, would it?—No.

4737. Would those lattices interfere with the flow of his water?—Certainly, if they were anything like that one in the room, unless they were put in a larger area than the mill-race itself. But that mill-race is much larger than is necessary to carry the quantity of water requisite for working the mill; it is a very large mill-race.

4738. You have given us a plan here of fry-guards which you would suggest should be put up at a cost, roughly, of 100 £. I want to know if they would interfere with the working of Mr. Webb's mill?—Not if they were attended to and kept clear.

4739. Would there be any difficulty in cleansing them?—There is, of course, when leaves are coming down in any large quantities.

4740. But leaves do not come down in large quantities in April, May, and June, do they?—No, they would not at that time of the year.

4741. They are also double lattices, are they not?—Yes, they are.

4742. So that you could take one pair up and clean them and put them down, and then take the other pair up, I suppose?—Yes.

4743. And in that way there would be no difficulty in keeping them clean?—That is the way the fry-guards are arranged, I believe, at Cork, on the Blackwater.

Chairman.

4744. In the construction of those works, which you have suggested would cost 35 £, 25 £, and 87 £, would it be necessary to stop the mill?—No; they could be put in, as I say, between two o'clock on Saturday and Monday morning, if they were arranged for the purpose beforehand.

Y

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MR. HARRARD.

[Continued.]

Chairman—continued.

4745. To cleanse these gratings would it be necessary to stop the mill?—No.

4746. Could it be done without stopping the mill?—It could be done without stopping the mill.

Mr. Seton-Karr.

4747. As I understand you, these lattices, of which you have given us a drawing, are only an alternative; you have already described to us a submerged trough which might be put down in front of the turbine at a cost of 25 £.—Yes.

4748. You have already described to us a grating at the head of the head-race which could be put down at a cost of 35 £.—Yes.

4749. If he had those two erections, would it be necessary to put this lattice up?—No.

4750. That is only an alternative scheme, is it?—Yes, an alternative scheme.

4751. Practically, so far as we have got, the only necessary protection for Mr. Webb to put up would be the 25 £. submerged trough, and the 35 £. grating?—That is so. It would be 25 £. for each turbine; he has two.

4752. That is 50 £. then?—Yes, 50 £.

4753. And 35 £. for the grating makes 85 £.—Yes.

4754. Would it be necessary for him to have a grating at his tail-race to keep the ascending salmon from going into it?—No, I believe it would not, in that particular case. The salmon would not leave the river to go into his tail-race.

4755. Is there any other protection he would have to put up in order to comply with the requirements of the Conservators?—I think not.

4756. Then I want to know, in your opinion, what you think he estimates in this sum of 1,400 £. I do not want any misunderstanding about this; I will read you the wording of his answer: "The estimated cost of putting up the erections which they (the Conservators) called upon me to put up was somewhere about 1,400 £; it would cost me 1,400 £ out of my own pocket to put up these erections." You have told the Committee that in your opinion, and so far as you know, only 85 £. would be required to cover what you conceive to be the necessary protection at that mill?—Yes.

4757. Can you give the Committee any idea as to what Mr. Webb meant by that answer?—I have not the slightest idea.

4758. You do not know what he was calculating?—I do not know what he was contemplating at all.

4759. You do not think that any such sum, or anything like it, is necessary, do you?—I think 85 £. or say 100 £. at the outside, would cover everything which is necessary.

4760. Would it be necessary to put up any expensive fish pass, for instance, at his weir?—A fish pass would be desirable, no doubt, in his weir.

4761. What would it cost?—I did not make an estimate of that.

4762. At all events you do not include that in what you have mentioned here?—No.

4763. Would it cost 100 £. to make a fish pass there?—I should think it would.

4764. More?—I should think more.

Mr. Seton-Karr—continued.

4765. Can you give us any idea of what you think it would cost?—When we meet again I could tell you.

4766. However, a fish pass is not urgently necessary here, is it?—It would be desirable, but it is not urgently necessary. I saw one weir where the salmon were endeavouring to get up and they were unable, owing to there not being sufficient depth of water over it, whereas if there had been a fish pass they could have gone up with the greatest ease.

4767. The other protection which you have described, the submerged trough and the grating, are absolutely necessary, in your opinion, are they not?—They are absolutely necessary, and equally beneficial to the millowners, as far as the trough goes, and the fishery proprietor.

4768. I want to return for a moment to the question of the supply of water to the turbine. Supposing this to be the surface of the mill-race, and here is the supply pipe going down to the turbine, and here is the bed of the mill-race, the whole power which runs the turbine is simply the fall in that pipe, is it not?—Yes, the turbine will be in a case, so; and here is the tail-race by which the water escapes, we will say, from the bottom of the turbine.

4769. This is the height of the water, and if you reduce that by any amount you reduce the power, *pro tanto*, do you not?—Precisely.

4770. As long as the water is kept at that level it does not matter at what speed it is flowing, does it?—No, it is simply the height of the water. The whole power depends on the level of the water between the surface of the mill-race and the bottom of the turbine.

4771. Therefore the pace at which the water flows has nothing whatever to do with the power, has it?—No.

4772. With regard to a breast or bucket-wheel, is it not a fact that the pace at which the water flows against the wheel has something to do with the power?—It is in a small degree due to impulse, but mostly to the weight of the water.

4773. But it is to some degree due to the impulse, is it not?—Yes. In an undershot wheel it is wholly due to the impulse.

4774. You say that, in the case of an undershot wheel, the power is wholly due to the impulse of the water, and in an overshot wheel to the weight of the water on the wheel, is that right?—Yes. We will say this is what is called in millwright's parlance (*drawing diagram*) an eleven o'clock wheel. The water is let on here through a sluice that is raised according to the level of the water, and it goes in with velocity, but with a small velocity, and therefore what is due to impulse in that case is very small; all the rest is due to the weight of the water.

4775. At the same time I suppose the rush of water must be kept up to a certain velocity in order to supply those buckets rapidly?—Of course the water has to travel in the mill-race with velocity sufficient to bring the quantity of water the wheel is consuming.

4776. That is not the case with the turbine, is it. All you want is the level of the water in that case, is it not?—It is the same thing; the water

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Mr. Selous-Kerr—continued.

water must pass along here in order to keep it up to that.

4777. You are combining cause and effect. It is a fact, is it not, that so long as the water is kept at that level the power in the turbine remains the same?—It remains the same; that is, so long as a turbine is at full work. A turbine is an adjustable thing. They can either partially close the buckets, or some of them are made double, so that when there is only a small quantity of water in the river they work the lower portion of it. It is not an unusual thing to have two turbines on one shaft, and the water is let in here. Here is the turbine case and the water is let in at the side, and if there is only a small quantity of water flowing down river they will shut off the upper turbine and work the lower one only.

4778. That is in case the water has fallen a little in its level, is it?—It is in case there is only a quantity of water sufficient to work the one turbine, they keep the water up to its full head in the mill-race to get the maximum amount of power out of it.

Mr. Toulmin.

4779. The difference will be that it would go through more slowly, would it not?—Exactly. If that turbine used 1,000 or 2,000 feet of water per minute, or whatever it might be, when one turbine was in use it would only use half the quantity. Therefore the water would flow then with half the velocity in the mill-race to keep it up to its overflow point.

Mr. Selous-Kerr.

4780. I want to have this quite plain. We have this: that the power of the turbine depends entirely on the fall of the water from there to there so that it does not matter what happens with regard to the pace of the water so long as the water is kept up to that level, or, in other words, the same head remains and the power of the turbine is not interfered with in any way?—That is so.

4781. The velocity of the water has absolutely nothing to do with it, provided the level is kept up, has it?—Provided there is sufficient water.

4782. Therefore any fry-guard that is put across here, even though it may check the flow of water, if it does not have the effect of reducing the level does not in any way interfere with it?—Just so, but if it interfered with the flow of the water it would.

Mr. Toulmin.

4783. Have you drawn the fish to scale in this sketch of the turbine you showed the Committee?—Yes, it is drawn to scale representing the size of the fish as compared with the size of the machine.

4784. What size of fish is that?—It is taken at 4½ inches long.

4785. Is that the average size?—About that; they are 4½ to 5 inches long.

4786. Supposing you have one of these perforated boxes in front of a turbine, the fish would come down to the box, I presume, if there was no grating at the head-race?—They might come into the head-race.

O.S.O.

Mr. Toulmin—continued.

4787. They would come into the head-race, and come down to the turbine, would they not?—Yes, but in front of a turbine grating at the lower end of a mill-race there is always either a bye wash or a relief sluice, and if they came down to the mill-race, and got to the perforated trough, they would then, when the mill was stopped for any length of time, or when there was more surplus of water in the mill-race, or when the sluice was raised, pass over the bye wash, or through the sluice into the river again.

4788. Then your idea is having these boxes is that the fry would remain in the head-race until the bye wash or sluice was open, is it?—Yes, till the bye wash came into operation, or the sluice was raised.

4789. You would have this perforated box, and you would have a grating of a kind to stop the spent fish at the head of the head-race, you say?—A grating to stop mature fish. The perforated trough would stop the fry, and the grating at the head of the mill-race would prevent mature fish coming into it.

4790. Would it be necessary to keep that grating always in position?—Only at such times as the fish were descending the river in the spring time.

4791. What are the months when you consider the spent fish are descending the river?—They run down in March and April, sometimes a little earlier than that, but the bulk of them go down in March and April.

4792. The spent fish would have ceased to come down before the fry have ceased to come down, would they?—No, the fry (or the smolts rather as distinct from the fry) and spent fish go down at the same period of the year.

4793. How do you distinguish smolts from fry?—By fry I mean the young salmon that stay a year or two in the river before they descend to the sea. When they descend to the sea they change their coats, as it were, and change their appearance altogether. When they are fry they are like a small trout, but when they are in the smolt stage they are silvery like a salmon.

4794. And they would be about 4½ inches long, would they?—About that; some may be 4 inches, some may be 5 inches long. I have seen them 5 inches long and over, occasionally.

4795. How old are they when they become smolts generally?—They stay about two years in the river after they are hatched.

4796. Suppose you have a proper fish pass in the river or an automatic fish pass, would the smolt still take to the mill-race in preference to the river, do you think?—I should think not, but I cannot say positively; some might take the fish pass, some might take the mill-race.

4797. Your observation does not enable you to say whether the smolts prefer a main river with a proper fish pass to a mill-race, does it?—No, I could not say that.

4798. Would you require to place automatic fish passes in old weirs as well as in new weirs?—I think they ought to be put into every weir; there are no fish passes in any of those weirs.

4799. There are many old fish passes, are there

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Mr. Tomlinson—continued.

there not?—There are no fish passes at all in them.

Mr. Macartney.

4800. Where?—In any of the weirs of these 13 mills which I examined.

Mr. Tomlinson.

4801. Are they all on the Bann?—They are all on tributaries of the Bann.

4802. What has happened in these cases is, I suppose, that the present millowners have come there, finding the old weirs without fish passes, and they have erected their mills, or altered their mills?—I presume that is so.

4803. So that you would not consider, generally speaking, that the millowner is responsible for the condition of the weirs, would you?—Oh, no.

4804. They have not made the weirs defective, have they?—Certainly not; the weirs are now as they were originally put up.

4805. Why would it not be sufficient to have a grating with narrower bars to keep out the fry; what is the advantage of a lattice over a grating?—I do not see that there is any advantage in a lattice.

4806. Then if it was found that a grating with comparatively narrow bars would do less to stop the flow of water, you think that would be sufficient, do you?—I think vertical bars would be sufficient. Bars with spaces of three-eighths of an inch or thereabouts would be quite as efficient as that lattice on the table is.

4807. Have you ever considered the question whether vertical bars of that kind would do less to stop the flow of water than a lattice?—A lattice, such as that, would stop the water much more than vertical bars.

4808. Then, in fact, in the interest of the millowners, vertical bars would be preferred, you think?—Certainly.

4809. And could you design vertical bars which would be quite as effectual as a lattice?—Yes, quite as effectual.

4810. Would they be more difficult to keep in order, or less difficult to keep in order?—They are much easier kept in order than such an appliance as that.

4811. If you had to advise a millowner whether he was to put up a lattice or a grating with vertical bars sufficient to keep out smolts, which would you recommend him to do?—To put up vertical bars; if I were a millowner myself I should put up the vertical bars in preference to a lattice.

4812. Then how is it you have been advocating a lattice to-day?—I have not.

4813. But you have produced a drawing of a lattice?—That was merely to show the cost of it.

4814. Would vertical bars be more or less costly?—They would be less costly than a lattice, and they are placed directly in front of the turbine. If vertical bars were put across the top of the head-race, as these gratings are shown, the bars would be much more costly, but I am speaking of the bars themselves just in front of the turbine, where they are now placed.

Mr. Tomlinson—continued.

4815. What I was trying to ascertain was, whether you could substitute these vertical bars for the lattice. You say it would be an advantage to the millowner to do so; I am assuming that where it is proposed to put up a lattice to keep out the smolts you are putting vertical bars to keep out the smolts; do you understand that question?—Hardly.

4816. Supposing a millowner objected to put in a sunk trough, and asserted that a sunk trough would tend to injure the flow of water to his turbine, and preferred something else?—Then if he puts an inclined grating in front of his turbine that is a sufficient protection to prevent the smolts getting into it, and then if he puts gratings at the head of his mill-race to prevent mature fish coming in, I think that would answer every requirement.

4817. Would these arrangements require any walls or foundations built to put them into?—Very small.

4818. Would you require to stop the mill whilst the walls and foundations were being put in?—No, I think everything could be done between two o'clock on Saturday and Monday morning. This shows the way in which the turbines are protected now (*producing drawing*). This is the plan of them, and when the leaves come and gather on these gratings, a man comes with a rake and rakes them up, and throws them on one side.

4819. And the grating you are showing me now is one that would keep smolts out, is it?—Yes.

Mr. Macartney.

4820. You have suggested an automatic fish pass, I understand?—Yes.

4821. Are you aware that the highest authorities connected with salmon fisheries, both in England and Ireland, have stated, in evidence before Committees of this House and before Royal Commissioners, that it would be, in their opinion, impossible to apply the same class of fish pass to every weir or dam?—Certainly; I daresay it would vary according to the position and kind of weir.

4822. And therefore the expense and cost of your automatic fish pass would vary enormously, would it not?—It would vary, of course. The automatic arrangement (to make myself quite clear) would apply only to the entrance of the fish pass.

4823. With regard to turbines, what is your opinion of a turbine as a hydraulic motor?—It is a very excellent one.

4824. And is a very valuable machine, is it?—It is a very valuable.

4825. You are aware, of course, that it has been very largely availed of in the United Kingdom, are you not?—Yes, it is available for every description of fall.

4826. And it has given considerable impetus to the milling interest, has it not?—Certainly; turbines can be used where no other motor is possible.

4827. I believe that you can divide turbines into two classes, roughly speaking; one where the revolving portion of it is absolutely, or almost, shaved

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Mr. Macartney—continued.

shaves like a razor the other part, and another where there is a certain amount of way room between the revolving portion and the fixed portion—I do not know of any turbine of that class.

4828. Do you mean to say that all the turbines closely shave round?—They are made as close as possible.

4829. In the "Loeffell," do you say there is no room at all?—Yes.

4830. Are you positive about that?—Yes, quite positive.

4831. In your opinion, then, there is no difference between one turbine and another in this particular point?—No. If there was that annular space you are speaking of between the guide plates and the revolving wheel you would lose power.

4832. I ask if, as between the revolving wheel and the fixed part of the casing, you say the revolving plate shaves the casing in all turbines?—Yes; anything that escaped through would be so much waste water. There was something which I think was not made quite clear as regards the action of the turbine.

4833. You put this wheel inside here, and inside there must be a clear space between the stationary casing and this wheel, must there not?—There is an annular space there.

4834. I mean it does not shave it, does it?—There would not be more than three-eighths of an inch space, I should think.

Mr. Sten-Karr.

4835. What was it you said was not made quite clear?—I think you were under the impression that when the fish comes down here they entered the wheel at once. There is an annular space round here; the fish would have to pass round the annular space, and then would be injected into the wheel through the guides. They would not go into the wheel directly, but would have to travel some distance round first.

Mr. Macartney.

4836. Putting it broadly, are there not two different classes of turbines, in one of which there is no space, and in another where there is that space between the revolving portion of the turbine and the stationary portion?—I do not know of any wheel of that kind; all the turbine wheels that are in use in that Bann district are certainly not of that description.

4837. Of which description?—Of the description you speak of; the ones where there is a free space.

4838. Do you mean to say there is no space?—There is a free space, but it is made as narrow as possible.

4839. Naturally it is made as narrow as possible, but there is a space, is there not?—Naturally, or the wheel would not revolve.

Mr. Pinkerton.

4840. There would be a waste of power if you had much space there, I suppose?—Water would be uselessly escaping.

O.B.O.

Mr. Macartney.

4841. You said the fry entering the turbine at Mr. Dinmore's would go down at a certain pace, and then would be whirled round. Is it not the fact that the fry would go straight out of the turbine, why should they be whirled round?—They would be whirled round some short distance.

4842. Would they not go straight out?—No; because the wheel is revolving, and they must go with it and then drop out.

4843. I forget what proportion of a second you said they would have to get through this aperture?—1-84th.

4844. How long an obstruction (say like this pen) could you pass through that turbine of Mr. Dinmore's?—I do not think that would pass through; it would be nipped.

4845. How long a thing could be passed through, do you think?—I do not think anything could pass through which is more than the width of the port; that is, about 4½ inches.

4846. We have it in evidence that an eel, 15 inches long, passed through?—But he was caught, I think. He did not pass through?

4847. Do you not believe an eel, 15 inches long, could pass through by any possibility?—Certainly not.

4848. You see these bits of wood. We have had evidence from Mr. Robinson that he passed these bits of wood through the turbine?—Yes.

4849. There is no mark upon them. I do not attach so much importance to that as to the fact that he passed through portions of turpins cut exactly like those bits of wood, which are more flexible, and would probably show any pinch; they were passed through a turbine?—So I heard. I did not hear about the turpins.

4850. They were produced here. With regard to the question of putting up the erections which you speak of, are you aware that a great number of the mills in this district are running night and day?—Yes.

4851. And that under those circumstances it would be only one day a week that the sluice and the bye-wash could be opened?—They knock off, I think, at 2 o'clock on Saturday afternoon.

4852. With regard to the shield or submerged trough, except at Beasbrook and Mr. Gilson's mill, have you ever seen it in operation?—Those are the only two places.

4853. I understand from you that the circular apertures at Beasbrook are five-eighths of an inch in diameter?—Yes.

4854. In your opinion is that aperture requisite in order to get a sufficient volume of water to work the turbine?—Yes, of course, you could have them smaller, but you would require a greater number of holes; but five-eighths is a convenient size.

4855. At Beasbrook you say there has been no difficulty about working the turbine?—Not the slightest.

4856. It is a McAdam turbine, is it not?—I do not recollect the class; there are two turbines there, one at the spinning mill, and the other upon the river.

4857. The water which feeds the turbine at Beasbrook

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[Continued.]

Mr. Macarty—continued.

Bessbrook is peculiarly clear water, is it not, and free from dirt?—No, it is ordinary water.

4858. But it comes from a small pond, does it not?—No, the mill is supplied from a mountain lake that was transformed into a reservoir. I constructed the works for them.

4859. There is perfectly clear water there, is there not?—But it runs about a mile and-a-half after it leaves the reservoir before it reaches Bessbrook, and for a portion of that distance the banks of the stream above Bessbrook, and in the immediate neighbourhood of Bessbrook are wooded, so that for a part of its course it is liable to have leaves getting into it.

4860. As a matter of fact, is there much *debris* coming down in it?—No.

4861. Would you say it was as dirty a stream as the main, for instance?—No, not as dirty as the main when it is in flood. It is not the turbid water that stops a turbine or prevents the flow, it is the leaves and *debris* brought down with it.

4862. I have never suggested for a moment that it was. The submerged trough at Mr. Gibson's mill is precisely the same as the one at Bessbrook, is it not?—It is very similar.

4863. Is there any material difference between them?—Yes.

4864. What is it?—That the Bessbrook trough is wholly submerged, but Mr. Gibson's trough rises above the surface of the water, so that a man can walk out on the top of it and rake the leaves and *debris* from the sides.

4865. Is that an advantage or disadvantage?—An advantage.

4866. So that, if anything, Mr. Gibson's trough is in a better position than the one at Bessbrook, in your opinion?—Yes.

4867. I understand that you are not in favour of the lattice?—No; not as long as the submerged troughs are used.

4868. Your suggestion is a submerged trough, is it?—Or gratings.

4869. I am coming to gratings presently, but at the present moment I will ask you, do you prefer the submerged trough?—Yes.

4870. You do not make a distinct recommendation of the lattice to the Committee, do you?—No, not if the submerged trough is used, certainly.

4871. You consider a submerged trough much superior, do you not. Did you hear Mr. Gibson's evidence with reference to the submerged trough at his mill?—I heard him examined, but I do not recollect his words.

4872. I will read it to you. He says that his turbine is one of McAdam's, and that it has worked first-rate, but there are inconveniences connected with it owing to the shield (which is what we called it then) which is liable to be stepped up by grass and leaves. Then he went on to speak of the improvement of turbine wheels. Then at Question 1126, he was asked if he would put up one of those submerged troughs with a new turbine, and he said he would object to do so, because of the loss of power and the difficulty of the weeds and grass, and ice clogging up. So that from his evidence it appears, does it not, that the only submerged trough at present in use

Mr. Macarty—continued.

in Ireland, with the exception of the one at Bessbrook, and one of the only two which you know of, has proved according to the evidence of the millowner, to be a failure?—But for all that, he has kept it there for 25 years.

4873. But are you aware he is going to put up a new turbine, and that he will not put anything of that kind up?—It certainly is not a failure as I saw it.

4874. Did you hear his evidence that he was going to put up a new turbine?—Yes.

4875. And that owing to the difficulty and inconvenience caused by this particular sort of shield, he was not going to put it up?—Then I should say he would be a very foolish man not to put up a protection of the kind.

4876. From what point of view?—It is the most efficient protection I know of from weeds, the easiest cleansed, and the easiest kept in order.

4877. But he says he has suffered great loss of power?—I cannot see that at all.

4878. That is his evidence; are you prepared to say that he has not?—The trough, when I saw it, was perfectly free from obstruction.

4879. How often have you seen it?—I saw it there in the afternoon.

4880. How often?—One day; there were some leaves on the bank that had been taken out that day, a very small quantity, and the man in charge explained the facility with which it could be cleansed, by taking the leaves away with a rake.

4881. Do you suggest to the Committee that you are a better judge as to whether there has been loss of power, or difficulty with weeds and grass, than the millowner himself, who has seen it in operation year after year?—I think I am quite as good an authority.

4882. Though you have only seen it once?—Though I have only seen it once. I could not have learned more if I had stayed there for a week. Of course if a trough is not attended to, as well as any other protection, it will in the course of time get more or less obstructed.

4883. You have stated to the Committee that your calculation of the cost of these submerged troughs was 25 l.?—Yes, it depends on the size.

4884. Do you know what the one at Bessbrook cost?—No, I do not. It has been up a great many years. That is a cast-iron one; but however, that would not affect it much.

4885. It cost a good deal more than your estimate, did it not?—I do not know.

4886. I am informed it cost 40 l.?—It is a very large one. The turbine is 160-horse power.

4887. A good many of them on the main are 150-horse power, I think?—Oh no, the largest that I saw certainly was not more than 70-horse power.

4888. Now with regard to the question of the power of a mill-race, anything put into the water which is feeding a hydraulic motor, will naturally diminish the power of the water, will it not?—It will obstruct the flow.

4889. And will not that diminish the power of the water feeding the hydraulic motor. I suggest to you that if the flow of water which is feeding a hydraulic

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Mr. Macartney—continued.

a hydraulic motor is obstructed, therefore you diminish the power which that water is bringing to the hydraulic motor?—If you obstruct it so far as to prevent a less quantity of water passing down the mill-race, then undoubtedly you do diminish the power.

4890. That is not my question; that I know perfectly well, but I also suggest to you something further, namely, that any obstruction placed in the water feeding a hydraulic motor which diminishes the power of that water will diminish the power of the hydraulic motor?—The power is dependent on the quantity of water.

4891. On nothing else but the quantity of water?—On nothing else but the quantity of water, and the fall.

4892. Do you say that pace is no element whatever, and that the pace at which water arrives at a hydraulic motor is no element whatever in the power of that hydraulic motor?—Nothing whatever to do with the power of the turbine. It does not depend on the velocity of the water coming to it in the mill-race.

4893. Do you say that the power of a turbine does not depend on the number of cubic feet of water passing through it within a certain time?—It depends entirely upon it.

4894. You agree in that, do you?—Certainly.

4895. The amount of cubic feet of water that you could pass through a turbine in a certain space of time would depend on the pace with which that water arrives at it, would it not?—It would depend on the quantity of water, not on the pace at which it runs in the mill-race. The water may pass in a mill-race at a velocity of three feet per second or five feet per second, or whatever it may be, and it will not affect the power of the turbine at all.

4896. But supposing you have a mill-race which contains a certain number of cubic feet of water, and cannot contain any more, and you put obstructions in the mill-race which causes the stream, which feeds the turbine, to become sluggish and stagnant, surely that will diminish the number of cubic feet of water passing through, will it not?—That is what I say. If you put an obstruction to prevent the passage of water down the mill-race that flowed down it before the obstruction was placed there, you diminish the power of the turbine certainly.

4897. And, therefore, any obstruction which materially impedes the flow of water in the mill-race feeding any turbine or hydraulic motor, would diminish the power of a turbine or hydraulic motor, would it not?—But at the same time you may put an obstruction in the mill-race, such as vertical bars across it, which would merely raise the water on the upper side of the bars, probably half-an-inch more than the lower side, and the water would pass through the bars then with a velocity sufficient to keep up the supply. It would just pen up, at the back of the bars.

4898. I understand from you, that if you put such obstructions in a mill-race, it would pen back the water in many cases coming to a turbine, we will say. Would not that, in many cases, have the effect of throwing the water, which is penned back away from the turbine, 0.80.

Mr. Macartney—continued.

over the weir leading into the river?—No, I think not.

4899. Would it not?—No, I think not.

4900. But surely, if the water was penned back to the extent of an inch or half-an-inch, and very little would pen it back, would it not?—I wish to correct my answer; if the bars were put across at the very head of the mill-race adjoining the weir, and the water was quite level with the crest of the weir, and was penned back, even an inch or so, then it would go over.

4901. And you would be diminishing the amount of water coming down the mill race, would you not?—You would, in that particular case.

4902. Now we will take the case where you put this obstruction immediately in front of the turbine; you would pen back water there, would you not?—No. Do you mean the bars or a submerged trough?

4903. I am taking any obstruction that would pen back water?—Yes, if it pens it back sufficiently, so as to allow it to pass to the turbine, but with a submerged trough, as I have described, the apertures should be of a sufficient size to admit the full quantity of water under all heads that the turbine would use.

4904. Your theory about the submerged trough is that the apertures should be of sufficient size and sufficiently numerous, is it?—Yes; their aggregate area should be larger than that of the pipes supplying the turbine.

4905. One question as to the matter of cost. It is not very material, but had you your attention directed to the requirements of the Conservancy Board with regard to Mr. Webb's mill?—No, I had not.

4906. Your estimate to-day is based on what you think necessary, is it not?—It is based upon what I saw on the spot.

4907. And what you think necessary?—Not what I think necessary, because I do not think those lattices or fry guards are necessary if a submerged trough, or proper grating, is put in front of the turbines.

4908. And I understand your gratings would be put in where his sluices are, would they?—Yes.

4909. Are you aware that the sluices are some considerable way down his race?—No, they are at the very head of his race.

4910. Not of the intake?—I beg your pardon, they are at the very head of his race. Here is a plan of his mill, and there are the sluices at the very head of the mill race (pointing on the plan).

4911. Is this plan absolutely accurate?—It is a sketch plan; it is not drawn to scale; but it is accurate for all the purposes of this inquiry. The sluices are exactly where I have placed them.

4912. How far are they away from the intake?—They may be 20 or 30 feet, perhaps; something of that sort, not more.

4913. You are aware that under the Act at the present moment the gratings must be put up at the intake, are you not?—At or near the intake. I said gratings at the tail race would not be necessary, for this reason, that there is

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Mr. HASSARD.

[Continued.]

Mr. Muscatney—continued.

that dead water there, and the fish would not leave the current of the stream to go into the dead water of the mill race.

4914. One question as to these bars which you have suggested; do you say that in your opinion you consider bars preferable to a lattice?—Yes.

4915. What diameter of bars would be put up?—Bars of about three-eighths of an inch flat bars.

4916. Three-eighths of an inch in thickness?—Yes.

4917. They would be a very material obstruction, would they not?—They would be no more obstruction.

4918. Taking the area covered by that lattice and supposing that you filled up that area with bars three-eighths of an inch in thickness and separated from each other by an aperture of three-eighths of an inch, do you say the same amount of water could get through?—More water.

4919. More water than with the lattice?—Yes.

4920. It would not cause so much obstruction, you say?—No, I think not.

4921. Is that your opinion?—That is my opinion, and they would be so easily cleaned.

4922. Do you or do you not agree with the statements made by the millowners that it would be impossible to work their machinery if lattices of that description were insisted upon, apart altogether from the question of fouling?—Apart from the question of fouling they could work just as well.

4923. Then you do not agree with their evidence?—Not at all, if sufficient water passes through.

4924. They have tried these things and they say even apart from the question of fouling it would be impossible for them to work their turbines satisfactorily?—I cannot see why, if the lattices were made sufficiently large to allow the quantity of water necessary for working the turbine to pass through.

4925. What do you call sufficiently large?—Of sufficient area.

4926. Do you mean to say by widening the intake?—Yes.

4927. Supposing that could not be done, what would happen then?—I did not see any instance where it could not be done at any of the thirteen mills I examined.

4928. Do you mean to say that there would be no natural difficulty in doing it?—Where I saw those lattices and they were in frames like that and they were put quite close to the turbine just in front of where the incline gratings are; and no doubt those are an obstruction.

4929. You think they would be a material obstruction do you?—I think so.

4930. But your view is that that obstruction might be obviated by putting them somewhere else and widening the area of the intake, is it?—Yes.

4931. Of course that would depend on whether that could be carried out, would it not?—Of course; but I did not see any instance where it could not.

Mr. Muscatney—continued.

4932. But supposing the land at the intake under the control of the millowner was only a very very narrow strip?—There might be a difficulty of that kind.

4933. Your suggestion to the Committee is this, is it; that you recommend a submerged trough as a proper solution of this difficulty. The only two cases that have come under your notice of the working of a submerged trough is the one at Beasbrook, and the one at Llanadfan, and to sum it up, there is a material difference between the amount of rubbish coming down at Beasbrook, and the amount of debris that might come down the main river; do you agree with that?—In times of flood, certainly more would come down the main river.

4934. But you think only in times of flood?—Only in times of flood, that is all.

4935. You see on that lattice which is here, the evidence of woollen refuse coming down, do you not?—Yes.

4936. Nothing of the sort would come down the Beasbrook water, would it?—No.

4937. Therefore there are elements in the main river which would tend to block it up, are there not?—Any fibrous woollen matter such as I see there; would not clog up a submerged trough.

4938. You had your attention called to the evidence of Mr. Gibson at whose mill the submerged trough has been in existence; to the effect that he has found it most inconvenient, and that he does not purpose in consequence of the inconvenience he has suffered from it, and the difficulty he has had in working the mill, to re-erect it; and you are aware, are you not, that however satisfactory such a trough may be with the M'Adam turbine, the evidence before us of the millowners, and I think some of the expert evidence is to the effect that you could not possibly work a Loeffel with it?—If Mr. Gibson found it useless, I am only surprised he has retained it for 25 years.

4939. Are you aware that it is absolutely necessary to put up a protection of that sort with a M'Adam?—I do not know what particular class of turbine a M'Adam is, but they are all on the same principle.

4940. Do you know the difference between a M'Adam and a Loeffel?—No, I do not; I am not familiar with the M'Adam turbine, but the principle is the same in all.

4941. We have had evidence here, to the effect that it is absolutely necessary to put up, as a protection, a submerged trough or shield, as it is called, with a M'Adam, where it is not absolutely necessary to put it up with a Loeffel, or more modern turbine?—I do not think that is the case at all.

4942. You do not know the difference between the two, do you?—I am not aware of the exact features of the M'Adam turbine.

4943. And without being aware of the exact features of the M'Adam, and how it differs from the Loeffel, are you prepared to disagree with the expert evidence which has been given as to that?—I believe the protection would be equally necessary

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Mr. HARRARD.

[Continued.]

Mr. Macartney—continued.

necessary for both. The principle of all turbines is the same.

4944. I know it is, but what I want to ask you distinctly is this: The substance of your evidence, without being aware of the differences between the McAdam and the Loeffel, is, that you are prepared to say that the expert evidence which is before the Committee, namely, that one requires the protection of a shield, and the other does not, is not accurate, is it?—I believe it is not.

4945. Do you disagree with me?—I disagree with it in so far.

Mr. Pinkerton.

4946. Do you know Mr. Dinsmore's mill?—I do.

4947. Do you know the sort of turbine he has in use there?—It is an American turbine, I believe, of the standard type.

4948. They are two Loeffel turbines, are they not?—Not at Mr. Dinsmore's?

4949. No?—I think they are standard turbines, the only Loeffel we were told of in the district belonged to the Hillmount Factory.

4950. Do you think it would be impossible for fry to go through Mr. Dinsmore's turbine without being killed?—I do.

4951. Did you see a letter from Mr. Dinsmore in the "Freeman's Journal" with regard to that?—No, I did not.

4952. According to that statement that appeared in the "Freeman's Journal," Mr. Dinsmore placed a grating with three-eighths of an inch apertures across his tail-race for 14 days, and during that time he saw a number of live fry but not a single dead fry, and this was during the month of April?—I am not aware of that.

4953. If there is any truth in your contention, the fry must have been killed in passing through, must they not?—I think a fish would have as much chance of life passing through Mr. Dinsmore's turbine as he would if passed through a turnip cutter.

4954. How do you account for the fact that Mr. Dinsmore found live fry in his tail-race, but no dead fry, during the period of 14 days?—I do not attempt to account for it; it seems to me to be incredible.

4955. And he examined the water carefully with an electric lamp in order that there should be no possibility of any mistake?—I do not know how to account for it.

4956. With regard to this grating at Mr. Webb's mill-race, would you be prepared to accept a contract to erect proper gratings at this estimate of yours?—I would, if I lived upon the spot; I would not do it living in London.

4957. If you were on the spot you would?—Yes, if Mr. Webb gave me the facility by shutting down his sluice at 12 o'clock on Saturday, I would have them in by Monday morning.

4958. You are not in favour, if I understand your evidence correctly, of lattices or gratings being placed across the intake?—Not a lattice, but a grating.

4959. But you are not in favour of their being placed at the immediate flow of the intake, are you?—Yes, I think that gratings should be
0.80.

Mr. Pinkerton—continued.

placed there to prevent mature fish getting into the mill-race. They are positively no obstruction.

4960. I thought I understood you to say that anything that obstructed the flow of water had a tendency to cause an overflow of the weir?—Certainly; but I was speaking there of lattices, or something that would obstruct the flow of water. Vertical bars with a clear space of two inches between them can be no obstruction.

4961. Your evidence has been principally devoted to the advisability of constructing fish-passes, has it not?—I think so. I think it would be most advisable to construct fish-passes that would cause no loss of water to the millowner.

4962. Could such fish-passes be constructed?—I should think so; quite easily; I can conceive no difficulty.

4963. Mr. Moore gave evidence with regard to that, and according to his evidence it is impossible to construct a fish-pass without diminishing the water flow?—Ordinary fish-passes would, but a fish-pass that could come into use as I say by an automatic arrangement, whereby the entrance to the fish-pass would be open only when there was water going over the weir which the miller could not use, would cause no loss of water.

4964. But why do you consider it necessary to raise the question of fish-passes at the present moment. It is outside the scope of this inquiry, and outside the Bill. The riparian owners have ample powers at present to construct those fish-passes, have they not?—I am not aware of that. I merely gave it as my opinion that I think a fish-pass could be put in without any loss of power to the owner.

4965. Mr. Macartney's Bill does not interfere with the right of owners erecting these fish-passes, does it?—I do not know; I merely gave it as a matter of opinion.

4966. Are you of opinion that those fry guards can be erected without interfering in the remotest degree with the interests of the mill-owners?—I did not say that; I think I said there was no doubt that fry guards, such as that, would.

4967. I do not care what you call it, you may call it a submerged trough, if you like?—Yes, a submerged trough could be erected without interfering in the slightest degree with the mill power.

4968. Of course, you have expressed no opinion as to who should be at the initiative cost of erecting those safe guards; is it your opinion that the cost of erection should be put entirely on the millowners?—I think, so far as the cost of a submerged trough goes, that it should be borne by the millowner. He gets a vastly increased power out of the water, and the machinery that he puts up is dangerous to fish life, and therefore should be protected.

4969. Is the additional power which has been obtained by a scientific research to be wasted in order to convenience the owners of fisheries, do you think?—Certainly not. I have not expressed an opinion of that sort.

4970. If the fishery owner gains by erecting these safeguards, why should they not be erected

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Mr. HASNARD.

[Continued.]

Mr. Pinkerton—continued.

at the expense of the owners of fisheries?—I do not see that the fishery proprietor gains much, but it prevents the destruction of fry to an extent that would not have taken place had the old bucket wheels remained. The cost of the turbine must be borne by the millowner, and I think the cost of protecting it should be borne by him also.

4971. You might as well ask the people of this country to go back to the side car and give up the steam engine as to put forward those ridiculous notions, might you not?—No, not at all.

4972. But you cannot lose sight of the fact that if you compel millowners to put any obstruction across a stream you must prevent them using the water, must you not?—But I say it is not an obstruction; it is a protection, and a protection to the millowner himself. A protection can be put up without being an obstruction.

Dr. Tanner.

4973. Is that a protection to the turbine, or a protection to the fishery?—A protection to the turbine directly, and indirectly a protection to the fishery.

4974. How does it protect the turbine?—Because it prevents obstruction such as sticks, leaves, and small matter, and fish getting into the turbine.

4975. But have not they worked those turbines hitherto without any such screens?—No, they have gratings more or less.

4976. But it is proposed to make the mesh work of the gratings smaller is it not, in order to prevent fish being destroyed in the turbine?—The gratings were made sufficiently close to prevent fish passing into the turbine, but sufficiently large to admit of the passage of water for the work of the turbine.

4977. Then the whole difficulty now depends on the size of the mesh; is not that so?—No, I do not recommend the mesh at all.

Mr. Pinkerton.

4978. You are aware that the millowners are willing to allow the owners of the fisheries to erect any safe guards at their own expense, which are not likely to interfere with the flow of water, are you not?—I have not heard anything about it.

4979. Have you not heard the evidence given to that effect before this Committee?—No, I have been here only part of the time. I have been in Ireland.

4980. Are you aware of any compromise that could be arrived at between the millowners and the fishery owners?—I have not considered the subject at all.

Dr. Tanner.

4981. What river is it you have given evidence upon. Do you know a number of these rivers where there are salmon fisheries?—I know other rivers where there are salmon fisheries.

4982. Do you know any rivers in the South of Ireland?—I do not.

4983. Do you know if these salmon fisheries are valuable to the riparian proprietors?—I

Dr. Tanner—continued.

believe they are very valuable to the owners, whether they are leasees, or proprietors of the fisheries, or riparian. There are many cases where riparian proprietors have no right to the fish.

4984. But the owners of property on the banks of some of these rivers as to which you have given evidence, have fisheries which are of great value, are they not?—I think not; I have no knowledge as to that.

Chairman.

4985. You have a knowledge of the value of mill machinery, but you do not know anything about property, I suppose?—I do not know anything about the value of property belonging to a riparian owner.

Mr. Macartney.

4986. Have you ever erected a turbine anywhere?—No.

Mr. Seton-Kerr.

4987. In reference to a question asked you just now, this submerged trough in your opinion is a perfectly good compromise or settlement between the fishery owner and the millowner, is it not?—I think it would meet the case entirely.

4988. That is the point of your evidence is it not?—Yes.

4989. With regard to this experiment made with the small pieces of wood and pieces of turnip (which we see are now dried up) as a matter of fact smolts are a little bit larger than those pieces, are they not?—Yes, about half as long again.

Mr. Macartney.

4990. Are they on the main?—They do not vary much in particular rivers.

Mr. Seton-Kerr.

4991. I am speaking to you now has having knowledge of the habits and size of fish. We have been rather loose in our use of the words "fry" and "smolts," have we not?—Yes.

4992. Salmon fry are the little things just after they hatched, are they not?—Yes, up to about two years of their existence.

4993. Then they turn into smolts, when they get up to four, five or six inches in length, and put on their silver coats, and go down to the sea?—As far as my observation goes, they seem to increase in size just before they run down to the sea, and they put on a silver greenish coat something like the coat of the salmon.

4994. That is when they become smolts, is it?—Yes.

4995. And before that they are fry, are they not?—Yes.

4996. Do they descend the river at all when they are fry?—No, only when they are smolts.

Mr. Macartney.

4997. Therefore fry cannot pass through any of these turbines can they?—It is when they change to smolts.

4998. When

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Mr. HASSARD.

[Continued.]

Mr. Seton-Kerr.

4998. When you talk about fry guards we mean smolt guards, do we?—Yes.

4999. We have been a little loose in this examination in using the two words, have we not?—The words have been indiscriminately used.

Mr. Toulson.

5000. Is there in your opinion any danger of the fry, apart from the smolts, getting into the mill-race and getting mixed up with the turbines?—No, the fry lie about the shallows and sheltered portion of the river, until they become smolts and descend to the sea.

5001. And there is no danger of this going down the river until they become smolts, is there?—No.

Chairman.

5002. Then the words "fry guard" should have been "smolt guard," should they?—Yes.

Mr. Seton-Kerr.

5003. There is only a difference in the name; the fact remains the same, that you must guard the smolts when going down to the sea. We have called them fry when we should have called them smolts have we?—Yes.

Mr. Finkerton.

5004. What size are they?—They vary a little; they are about four and a-half inches. I have seen them five inches long.

Mr. Seton-Kerr.

5005. They become smolts in the early spring, do they not?—Yes, about March or the end of February.

Mr. RICHARD FOLEY, called in; and Examined.

Mr. Seton-Kerr.

5013. I BELIEVE you are a civil engineer of 28 years' standing?—Yes.

5014. Nine of which have been spent in the Irrigation Department of the Indian Public Works?—Yes.

5015. There you naturally had considerable experience in hydraulic work; had you not?—Yes.

5016. Have you erected turbines and other water-wheels?—Yes.

5017. You are also, I believe, lessee of the Blackwater General Fishery, are you not?—Yes.

5018. Have you established a salmon hatchery?—Yes.

5019. Are you also a millowner?—Yes.

5020. Where is your mill?—It is on a tributary of the Blackwater, near Lismore.

5021. I believe you have given a considerable amount of attention to the points in dispute between the fishery owners and the mill-owners?—I have given careful attention to it.

5022. You also are prepared, are you not, to give the Committee statistics of the number of fishermen who are dependent on salmon fishing for their living?—Yes, I have statistics.

5023. With regard to the habits of salmon, 0.80.

Mr. Seton-Kerr—continued.

5006. And directly they become smolts by putting on their silver coat they then proceed to go down to the sea, do they not?—Yes, and then they come up again in the autumn as young salmon.

5007. With regard to this experiment, do you say that that piece of wood does not fairly represent the size of a smolt?—No, that is much smaller. A smolt will probably be half as long again.

Mr. Macartney.

5008. In the Mea?—They do not vary much.

Mr. Seton-Kerr.

5009. You are speaking of the smolts, are you not?—Yes, I have not seen them in the Mea, but they do not vary much in other rivers.

Mr. Macartney.

5010. There is evidence that they differ very much in size in different rivers?—Fry no doubt differ very much in size, because they are perpetually growing from the time they are hatched until they turn into smolts, but I have never seen smolts vary much in size.

Mr. Seton-Kerr.

5011. However, in your opinion this piece of wood is rather smaller than the smolts which you have any knowledge of?—Yes.

5012. Do you think that the fact of a piece of wood like that going through a turbine without injury, is any argument to show that a smolt could do the same?—I think it would have been much more satisfactory if the experiment had been carried out with fish.

Mr. Seton-Kerr—continued.

will you very shortly tell the Committee the time of the year at which the spawning salmon run up the river and also go down again after they have spawned?—In our river, the Blackwater, which is a typical river, I think, spawning fish begin to run about the middle of August, a few before that, but the great run is in August, September and October and all through the winter months the spawning takes place. It takes place from November, December, January principally, and a little in February, but not much. Then the spent fish begin to go down, some in December, a good many in January, but the principal run is in March. In March they are clear out of the river if there is no obstruction and there is sufficient water.

5024. The majority of slats or kelts or spent fish go down in March, do they?—Yes.

5025. They are all cleared out of the river by April at any rate?—Yes, if there is no obstruction; but they are very often kept back for want of water.

5026. If they are obstructed they are apt to die, I suppose?—They are apt to breed disease and die.

5027. I suppose in some rivers the salmon begin to run earlier than August, do they not?—Yes, x 2

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Mr. FOLEY.

[Continued.]

Mr. Seton-Karr—continued.

—Yes, no doubt, and the summer fish that spawn too in the proper season, but they spawn no earlier than the autumn fish.

5028. The distinction that you draw is that the autumn fish are heavy with spawn, is it? —Yes; they are not fit to kill, or fit for the market after August.

5029. With regard to the smolts, or fry as we have miscalled them sometimes, what have you to say?—They call them all over Ireland fry, but smolt is the proper name.

5030. At what time do they go down the rivers to the sea?—A few in March, a good many in April; generally from the 15th of April to the 15th of May, the greater number of them run; they are then at least 16 months old, and many of them two years.

5031. Are you speaking of the Blackwater? —Yes; but probably all the southern rivers are the same.

5032. Are you acquainted with the Blackwater, the Lee, and the Suir?—Yes; but particularly with the Blackwater.

5033. It is quite clear the distinction between fry and smolts is, that they become smolts before they go down to the sea, is it not?—They are practically the same, but in March they begin to put on the silver scales, and when they are perfectly silvery, they are then properly called smolts, and they then go down to the sea.

5034. And they are from 15 months to two years old then, are they?—They are never less than 15 months, and I suppose they might be two years.

5035. How do they go down to the sea?—They drop down tail first in shoals; they go from one little gravel bank to another, from one stream to another, and take it by starts.

5036. Do they go down in large shoals?—Yes.

5037. And do they follow one another like a flock of sheep?—Yes, they evidently follow some leader.

Mr. Timinson.

5038. While going tail first?—Yes, apparently.

Mr. Seton-Karr.

5039. Supposing there is a large shoal of fry going down a mill-race to an unprotected turbine, are they bound to go down that turbine?—They are bound to go down that turbine.

5040. Nothing will stop them, will it?—No, they follow the strongest water; when they come to a mill-dam they naturally follow the stream of the head-race if it is strongest.

5041. The noise of the machinery would not have the effect of stopping them, would it?—No; besides, they would come into the head-race, perhaps, half-a-mile above the turbine, and once they are in they do not go back again, they drop down always.

5042. Then you do not think it possible for a shoal of smolts on their way to the sea to go down a mill-race, and then, frightened by the noise of the machinery, to go back and down the river again, do you?—Unless the head-race is very short indeed it would be utterly impossible. As a matter of fact, at the Cork Waterworks,

Mr. Seton-Karr—continued.

I saw them. There it was only three or four yards to the weir; the turbines were just below them, and they were swimming backwards and forwards in front of the guards; there were powerful turbines working, but they did not mind them in the slightest; they were playing about in front of those guards.

5043. Could not they get through those guards?—They could not get through those guards because they are properly constructed.

5044. What became of those fry afterwards?—They passed down on the first rise of the water, when the turbines were shut down they went over the weir.

5045. You said just now unless the head-race was very short they would not think of going back?—No.

5046. What do you mean by very short?—I do not believe they would go back 300 yards.

5047. Would they go back a hundred yards?—I doubt very much if they would.

5048. Would they go back 50 yards?—They might go back 50 yards possibly, because it is not very much.

5049. But in ordinary head races, which are 300 or 300 yards, they would not think of going back, would they?—If they do not go through the wheel and come to the gratings they will stop there till they are flushed out through a waste sluice which every wheel ought to be provided with.

5050. Supposing there was an adequate fry guard and a bye wash or waste sluice, would they stay until the waste sluice was opened and then go down the tail-race?—Yes, and be perfectly safe.

5051. What is your opinion with regard to turbines killing smolts?—I think every turbine will kill some, some will kill all. It depends on the construction of the turbine.

5052. Will any turbine let them through safely?—I doubt if any one will let all through safely.

5053. Do you think every turbine will kill some?—Yes.

5054. Taking the least dangerous turbine, what per centage do you think it will kill?—I saw a telegram from Sir Thomas Brady about some experiments; he will be able to give evidence to that effect.

Chairman.

5055. Give us your own evidence please?—I have no practical information as to the killing of fry in turbines, because there is only one turbine on our own river. I have information from the inspector that that does kill an immense number of fry.

5056. From what inspector?—Our fishery inspector; the Board Inspector of the Lismore district.

Mr. Seton-Karr.

5057. Have you ever seen a turbine at work?—Yes.

5058. Have you seen this particular turbine at work?—No.

5059. What turbines have you seen at work?—I have seen turbines in the north at work, and I have seen the Cork turbines.

5060. From your knowledge of fish, and what you

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MR. FOLEY.

[Continued.]

Mr. Seton-Karr—continued.

you have seen of turbines, do you say you do not think they have much chance of going through them without injury?—I think a great percentage of them would be killed, and with some turbines nothing can pass through. It would be almost impossible for the fish to pass through alive. Even if they are not ground up, the impact or force of the water drives them against the buckets with sufficient force to kill them; they are very delicate little things, and the least blow would kill them.

5061. Do you think a blow that would make no impression on a piece of wood like that would kill a smolt?—Certainly, it would; that piece of wood could only be damaged by getting in between the buckets.

5062. Therefore you do not attach very much value to that experiment, do you?—No, I would not. More than that there would be a very fair chance of some fry getting through the turbine that that passed through, but a good many must be killed.

5063. Where is your mill?—My mill is on a river called the Owenash, just by Lismore; it is a bucket wheel mill.

5064. How many mills are there that you know of in that district?—An immense number all through the district.

5065. But there is only one you know of with a turbine?—Yes, that is away up in Mill-street.

5066. That is the only one that was a turbine, you say?—Yes; it is not a mill, it is used for panning; it is a tributary.

5067. I suppose old bucket wheels and breast wheels do not kill the fry?—No, I do not think they did the slightest injury to fry.

5068. Do they kill the spent salmon?—A spent salmon has a fair chance with an overshot wheel; but in a breast wheel they are almost certain to be jammed between the front apron and the seats of the bucket.

5069. Are these wheels likely to be converted from bucket wheels into turbine wheels?—I think it is very likely if there is a revival of trade and business in the south.

5070. That means, in your opinion, does it, that a very great injury will be done to the salmon fishing?—Eventually very great injury will accrue to our particular district.

5071. Do you know the Cork Waterworks?—Yes.

5072. The turbines there are protected, are they not, by guards?—They are very efficiently protected; last year, they were protected by a lattice, which was a terrible nuisance.

5073. Was it like that one in the room?—Something like that, but perhaps a little better constructed than that. It used to choke up, but now they have vertical bars, and there is no difficulty at all.

5074. What is the distance between the vertical bars?—Three-eighths of an inch.

5075. Is that sufficient to keep out fry?—Quite sufficient.

5076. Then those are perfectly efficient fry-guards, are they?—Perfectly efficient.

5077. Have you seen them yourself?—Yes, I have seen them.

Q.80.

Mr. Seton-Karr—continued.

5078. How long have they been there?—Only this season; I suppose about March, when the fry first begin to appear, they were put then.

5079. Do they interfere with the working of the turbine?—Not a bit.

5080. In your opinion, should all turbines be protected?—I think they should, as much for the sake of the miller and the turbine as for the fry. Every turbine that I know of has a grating of some sort in front of it.

5081. What kind of guard would you suggest as being a good protection for the fry and also as not interfering with the mill?—A great deal depends on the construction of the mill and the race. In some cases I think the vertical bars, as on the Cork Waterworks, are by far the best. In some the submerged trough, as described by the Mr. Haasard, is very good; it depends altogether on the circumstances of the case. Either one or the other is very efficient, and no obstruction is caused by them as far as I can see.

5082. You have no knowledge of submerged troughs yourself, have you?—I have seen them; I have seen Mr. Gibson's.

5083. Do you think Mr. O'Toole's guards are just as good?—Yes.

Dr. TANNER.

5084. That is Mr. O'Toole, of the Cork Waterworks, is it?—Yes.

Mr. Seton-Karr.

5085. Millers already for their own protection put up gratings, do they not?—Yes. They are gratings with bars about an inch apart.

5086. Do you think that the same gratings should be used with the bars put closer together?—Yes, and that they should have a smaller section. They are very often one inch section, but if they are half inch section you could put twice as many in.

5087. You mean by reducing the diameter of the bar?—They are generally square; and I mean by reducing the size you would get the same area of opening and the fry could not get through.

5088. Do you think they would not be difficult to clean?—No, if properly constructed there is no difficulty.

5089. You only want to protect the fry during the three months, do you not?—Only the three months, and generally there is very little debris coming down them, a little water weed would be the only thing; there are hardly any leaves there.

5090. Were not a large number of fry seen going under Mallow Bridge the other day?—Yes, on the 11th of April.

5091. Large shoals?—Yes, great shoals.

Mr. Macartney.

5092. Do you mean smolts?—Yes.

Mr. Seton-Karr.

5093. These fry that were seen under Mallow Bridge had all come down from the vicinity above these bucket wheels, I suppose?—Yes; and in the condition of the water they must have all gone over Clondulane wheel.

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5094. Supposing

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[Continued.]

Mr. Seton-Karr—continued.

5094. Supposing an unprotected turbine had been substituted for that bucket wheel, as may be done some day, all those fry would have had to go through that turbine, would they not?—Yes, and I think there would have been most terrible destruction of them.

5095. And that means a serious injury would have been inflicted on the fishery in a couple of years' time, does it not?—Yes, a most terrible injury.

5096. Do you think that gratings should be put on the head-races and tail-races of mills?—No, not in every case. Perhaps, in some cases a proper waste-sludge just above the mill-wheel would be better, to let the fish drop down the mill-race, and let them out of the tail-race once a-week. I think very often that would be better than having gratings at the head of the intake.

5097. Where would you have them?—Just above the mill-wheel or turbine.

5098. At the tail-race, what would you do?—It all depends on the river. Tail-races are difficult things to protect, and in many cases there is no necessity for protecting them. In some cases the fish, spring fish, and nearly everything, will go up a tail-race. They should be protected; but in other cases they do not go there at all, but keep to the main river.

5099. Is that a question which should depend on the fishery inspectors, do you think?—Yes, I think so.

5100. And if they give an exemption from tail-gratings, well and good?—Yes.

5101. But if, in their opinion, tail-gratings should be put up, do you think they should be put up?—Yes.

5102. In that case, do you think it would affect the working of the mill at all?—If it was neglected it would throw backwater on the mill in many cases when there is a lot of rubbish going down.

5103. But if it was properly constructed, I suppose there is no reason why it should do that?—I think there is no reason why a contrivance could not be constructed that would clear itself.

5104. Or if occasionally looked after and kept clean?—Yes.

5105. It would not be necessary, of course, to have the bars of those gratings so close together as is required in the case of the fry-guard, would it?—No, I think two inches would be a proper thing.

5106. Have you read Mr. Macartney's Bill?—Yes, I have.

5107. You know, I suppose, that it proposes to throw on the Board of Conservators the responsibility and cost of erecting suitable guards and gratings?—Yes.

5108. Providing that they did not interfere with the effective working of a mill?—Yes.

5109. What are your objections to that proposal?—It would smash any board in Ireland utterly; they could not do it.

5110. Why?—They have not any funds. We want a great deal more funds than we have to protect the rivers in the spawning season, and there is no fund to spare. I do not believe any board could work, without friction, with the

Mr. Seton-Karr—continued.

millers. There would be always complaints as to their mill power being interfered with, and I do not think it would ever work.

5111. Would it result in litigation, do you think?—It would result in litigation, or else there would be no gratings put up at all.

5112. And in that case, of course, the fisheries would be ruined, in your opinion?—They would, in my opinion, certainly.

5113. I suppose you have your argument on the fact that the proposal is to throw, not only the cost, but the responsibility of erecting protections, on the Boards of Conservators?—Yes.

5114. You think that would not work?—I do not think it would work at all.

5115. I suppose, if they got into difficulties, and their relations with the mill-owners were not very good, they might not be allowed to go on to the land?—There would be endless disputes and difficulties. They never could work together, I am sure.

5116. Do you think that efficient guards could be provided at a moderate cost without interfering with the working power of the mill?—I do, without interfering with the working power of the mill.

5117. Of the kind you have already indicated?—Yes, with vertical bars of proper construction, or a submerged trough.

5118. You said you had a salmon hatchery?—Yes.

5119. Will you tell the Committee about your salmon hatchery?—It is just below the mill; it is supplied by the mill-race.

5120. Where is your mill situate, do you say?—It is situated on the Blackwater; it is fed by the Owenahadri river.

5121. How far from the mouth of the Blackwater is it?—Twenty miles.

5122. You are below Mallow, are you not?—Yes, just by Lismore.

5123. Yours is a bucket wheel, I believe?—Yes.

5124. Do you turn out large numbers of fry and smolts from your hatchery?—Yes; we lay down about 600,000 eggs every winter.

5125. Do not answer, if you do not wish to; but would you have any objection to telling the Committee what capital you invested in your hatchery?—Between 500 £ and 600 £ the original outlay would be.

5126. Was that in order to improve the salmon fishery?—That was in order to improve the salmon fishery. Of course we only catch a small number of the fish returning, a very small number. There are such numbers fishing below us that they get the lion's share.

5127. Supposing this Bill is passed, what will become of your salmon hatchery?—It would not affect us at present, there being no turbines below us.

5128. But supposing turbines were erected, and that there were no obligations practically on the mill-owners to protect them, as is the case under the proposed Bill, what would be the result?—I would give up the hatchery at once.

5129. In that case would you give it up?—Yes, I would.

5130. Do you think it would be fatal to hatcheries?—I do. I know of one hatchery, Mr. Moore's, on the Foyle, and I am sure the capital

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capital invested there must be close on 3,000*l*. It is close above Zion Mills, which have bucket-wheels at present; but if they were turbines, I think Mr. Moser's outlay would be thrown away.

5131. Do you think his hatchery would be ruined?—I think so. I am certain of it; and there is a very large capital invested in it.

5132. In other words, do you think this Bill will be fatal to salmon culture?—I think so. I do not think any man would hatch fish to be ground up in turbines; he would be a fool if he did.

Mr. Macartney.

5133. Is the hatchery above or below Zion Mill?—It is above.

Mr. Seton-Karr.

5134. Therefore all the fry would have to go through the mill and through the turbine, if there was one there, on their way to the sea, would they not?—Yes. In the spring the river is very low.

5135. Do you know Mr. Brazier, the Board's inspector?—Yes.

5136. I believe you obtained information from him about the number of mill wheels on the Blackwater and its tributaries?—Yes.

5137. How many are there?—About 150.

5138. There is only one turbine, I believe, is there not?—Only one.

5139. Where is that?—It is near Mill-street. It is on a small river, the name of which I forget; it is the Finnow, I think.

5140. Are you informed that that turbine kills large quantities of smolts every spring?—Mr. Brazier says he has seen quantities killed, and he was going to prosecute the owner of the turbine if he did not put up an efficient guard.

5141. What happened?—I do not know; I have not heard the result.

5142. Who is the owner of this turbine?—I do not know who the owner is. It was erected for pumping water out of a quarry, Mr. Brazier told me.

5143. Do you know what is the name of the lowest mill on the Blackwater?—It is Clondalane, just below Fermoy.

5144. That has a breast-wheel, has it not?—Yes.

5145. And during dry weather it takes the whole flow of the river, does it not?—Yes.

5146. Do you know of any kelt having been killed there?—By Mr. Brazier's information, numbers were killed there.

5147. When?—The 21st April, I think, was the date he gave me.

5148. Were they killed by the wheel?—Yes.

5149. There is a large amount of spawning ground above that mill, is there not?—The principal spawning ground is above that mill.

5150. How many miles of spawning streams are there?—I estimate about 800 miles, going up into all the little tributaries and glens. There are about 800 miles which fish actually frequent for spawning. I have a map of them here.

5151. Then, in your opinion, if this Bill is passed, and as a natural consequence, if turbines are erected, the Blackwater fishery would be 0.80,

Mr. Seton-Karr—continued.

ruined?—I think it will be very seriously damaged.

5152. At all events, as far as you are concerned, you would not care to continue your hatchery, would you?—No, not if turbines were erected. There is not likely to be a turbine below us, because we are just near the tidal water, so that we should gain the benefit in the fish coming up.

5153. Yours would be a special case, would it?—Yes. There can be no mill below us practically.

5154. If there were unprotected turbines above you, there would be no use in your hatching, would there?—If there were a possibility of that, I would not go on with the undertaking; but that could not be in our case.

5155. Do you think the American weed has damaged the fish at all?—I do not think so in the slightest. There are no American weeds in the glens where the fish breed mostly, and in the rapid waters; it is only in the still waters they are to be found.

5156. Do you know of any American weed near you?—In some of the branches of the river there is American weed, and in the canal just by us there is a lot; it is full of American weed, and it is full of fish. In fact, a good deal of the salmon which we breed go into this canal before going into the sea, and it is swarming with young smolts. They swim in and out of the American weed, and it gives them shelter and food.

5157. Does it not affect them at all?—Not in the slightest.

5158. Do you think that is quite a mistake?—Yes, quite a mistake.

5159. Do you mind giving the Committee your statistics with regard to the number of men who actually depend for their livelihood on the fishing in your district?—In 1891 there were 262 single-rod licences. That practically means 262 men, because a great many of them are professional fishermen, and gentlemen employ gillies; so that we may take it that 262 rods represent 262 men depending on rod fishing.

Mr. Macartney.

5160. All the year round?—No, not all the year round; all the open season, that is from the 1st February to the end of September, which is the duration of the rod-fishing season.

Mr. Seton-Karr.

5161. That is seven months?—Yes. Then there are four cross lines which involve two men for each line, that makes eight. They are fished mostly below Fermoy. Then there are 30 snap nets, and it takes four men to fish a snap net. They fish in two cois, two men in each, which means 120 men.

Mr. Macartney.

5162. How long does that fishing last?—From the 1st February till the 31st July. Then there are 20 draught nets with an average of four men, but in some cases it takes seven men to fish a draught net. However, taking four all round, that would represent 80 men. Then there are 70 drift nets. It takes four men to fish a drift net, and that represents 280 men. Then there are three

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three stake weirs, and it takes about four men each to watch them and keep them in order; that makes 12 men.

Dr. TANNER.

5163. Where are those?—Those are in the tidal waters.

Mr. Seton-Karr.

5164. Are there any others?—No, that is the total amount.

5165. Does that include the men on the coast?—That includes the men who fish out in the bay. These are the licenses which are taken out in the district.

5166. That makes a total of 762 men, does it not?—Yes.

Dr. TANNER.

5167. Fishing inside the bay?—No; there are some fishing out in the bay in the open sea.

5168. On the other side of Cable Island?—From the bar out to Cable Island, and it includes also the district which extends from Helvick Head to Ballyvaughan Island.

Mr. Seton-Karr.

5169. Are those men fishing outside included in the 762?—Yes, they are included, they are coast fishermen.

5170. Are all the coast fishermen included?—Yes, all the coast fishermen who fish for salmon.

5171. Then that practically means that 762 men are dependent for their livelihood on the supply of salmon from that river, does it not?—Yes.

5172. You told us they only fish for a certain season, but I take it during that season they earn their year's living?—They have nothing else to do, particularly with regard to the drift and draft net season, for the rest of the year.

5173. Therefore, are they entirely dependent on this industry?—They are; they have no other source; there is no sea-fishing there worth considering.

5174. And if the smolts are chopped up in the turbines, I suppose it means there will not be any salmon for these men to catch?—That would be the natural result.

5175. Are there any other men partially dependent on the industry?—There are, of course, on the red-fishing alone there are a great many dependent. There are car-owners, hotel proprietors, and so on, who benefit by it. There is no knowing where it begins and ends. It means a lot of money brought into the country.

5176. It means that the injury inflicted on that district by the destruction of salmon fishing would be very large, does it not?—Of course it does; fishing brings a very large amount of money into the country.

5177. Have you included all the men who make their living by red-fishing above Mallow, in the numbers you gave us?—I have included all the licenses taken out in the district.

Chairman.

5178. Have you included your own men employed on your own fisheries?—Yes.

Mr. TOWLISSON.

5179. You spoke of the income of the Board of Conservators of the Blackwater as being comparatively small?—Yes.

5180. Is it sufficient now to pay for all the work you require done?—Not nearly sufficient. It is between 850*l.* and 900*l.* a year, and it is not sufficient to put on all the bailiffs we want in the close season.

5181. What is the source of income?—The source of income is the licenses; the money paid for these licenses, and the 10 per cent. valuation.

5182. What is the 10 per cent. valuation on?—On various fisheries.

5183. On the several fisheries?—Not necessarily several fisheries. All proprietors who have a fishery or a bit of a bank of a river which is considered of any value (it is valued by the poor law valuers) are liable to be taxed as with regard to other property.

5184. But the riparian proprietors have fishing rights, have they not?—Yes.

5185. Yours is a several fishery, is it not?—Yes.

5186. How did you acquire it?—We leased it.

5187. Is it held under charter?—Yes, an ancient charter; we lease it from the Duke of Devonshire.

5188. Is the Blackwater well provided with salmon passes?—There are passes at the two weirs at Clondulane and Fermoy. They are old weirs and old passes comparatively; they were remodelled a few years ago.

5189. Have you any scheme for increasing the income of the Conservators?—We have no other source of income that we can possibly see.

5190. So that, as far as you can see, the river must remain insufficiently protected—Unless by Act of Parliament we can get a small license on trout rods, which would bring in something; but we have no other source of income now.

Mr. Macartney.

5191. What conservancy district are you in?—Lismore.

5192. Are you a member of the board?—I am.

5193. The fisheries in that district are very valuable, in your opinion, are they?—They are.

5194. You are the lessee of a very valuable fishery, are you not?—Yes.

5195. I see that, according to the financial return of your board, you are in a rather more flourishing condition than some of the other boards?—We are.

5196. Your expenditure, you say, in the last report, was well inside your income?—Yes, because we had to economise. Some years ago our then inspector, Captain Franks, was very zealous, and ran us into debt, and we began to economise, and now we are clearing it off.

Dr. TANNER.

5197. Is that the gentleman who prosecuted the Lord Lieutenant?—No, I think not.

Mr. Macartney.

5198. Your income is made up from the licenses you

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Mr. Macartney—continued.

you receive, the fines, and the rates on the poor-law valuation, is it not?—Yes.

5199. I see that last year you got 78 £ 4 s for the rates on the poor-law valuation?—Yes.

5200. Do you think that income is insufficient?—Yes, it is quite insufficient.

5201. Quite insufficient to protect the valuable fisheries you have got?—Yes.

5202. Has it ever occurred to you that you might protect those fisheries sufficiently by putting your hands into your own pockets, as some of the other fishery owners do?—We do.

5203. But I do not see any return of subscriptions here?—I used to give a subscription at one time, but I prefer spending the money myself; I think I can do it to better advantage.

5204. In fact no subscriptions appear?—No; but we spend a lot of money ourselves, as we think, to better advantage than it would be spent by handing it in to the general funds.

5205. We have it in evidence from Mr. Moore, who represents the Londonderry Board, that in addition to the subscriptions which appeared in the return here the proprietors of the fisheries in the Londonderry district spent a sum of money amounting to 700 £; how much do you imagine the proprietors of the fisheries spend in protecting their valuable interests?—Where?

5206. In the whole of your district?—We spend over 200 £, and the Duke of Devonshire about 200 £; about 400 £ altogether.

5207. You spend, do you, about 400 £ altogether in the whole of that district?—Yes; the other proprietors do not spend anything.

5208. Are you and the Duke of Devonshire the only two people who put your hands into your pockets to protect your interests?—Quite so.

5209. And the other owners do not contribute a farthing to the expense of protecting their interests?—No, except what they have to do.

5210. But they would like to raise it out of other people's pockets by putting a license on trout fishers, I suppose?—Yes.

5211. In fact they would like to raise it in any way, so long as it is not out of their own pockets?—Yes, so long as it is not out of their own pockets. I do not think that is confined to fishermen and owners of fisheries, though.

5212. Do you say that the licenses for draught nets, drift nets, and stake nets are always issued to different persons?—They are issued to whoever comes forward; that is, a 3 £ license.

5213. You have given the Committee an idea of the number of people who you say depend for their living upon fishing purely, and you arrive at that estimate by the number of licenses which are issued for draught, drift, and stake nets, and other things. Now, I ask you, are all those different licenses invariably issued to different people?—One party might take out two or three, but he would require the number of men necessary for each one.

5214. A man might have a draught and a drift net license, might he not?—Yes; but he would have to have four men to fish each.

5215. Would they invariably be employed at the same time?—Almost invariably they would be employed at the same time.

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Mr. Macartney—continued.

5216. It would necessitate different employment, would it not?—It would necessitate different employment, because the time of tide that suits the draught net also suits the drift net.

5217. You have no experience of turbines, have you, except as to the one at the Cork Water-works?—No; I have seen some in the north of Ireland.

5218. Do you know what sort of a turbine it is at Cork?—It is an American patent; I do not know the name of it.

5219. What other turbines have you seen?—I saw Mr. Gihon's. I did not see the turbine itself because it was under water, but I saw the submerged trough and the general arrangement.

5220. I do not know whether you are aware or not that that is a McAdam turbine?—Yes, I am.

5221. Are you aware that Mr. Gihon told the Committee, and that we have had other evidence to the effect, that the McAdam turbine requires a different sort of protection from any other?—That is a fact, I believe.

5222. And he told the Committee that they have very great difficulty with this erection, that it had given them a great deal of trouble, that it was constantly choking up, and that they did not intend to put up such a protection with a new turbine?—I do not see why it should give trouble except in autumn, when the leaves are coming down; I cannot understand its giving trouble in the spring.

5223. But, as a matter of fact, Mr. Gihon has said it gave constant trouble, and in consequence of that they do not intend to put up another. You have had no experience, have you, except having seen the water ways of these turbines, and you know the one at Cork?—Yes.

5224. What do you mean by a properly constructed grating at a tail race, which you say might be put up?—I mean a grating that can be easily closed, and having vertical bars, and no cross bars, or if a self-acting one could be devised and maintained it would be better still.

5225. Have you ever seen a self-acting one?—No, but I do not see why it could not be done.

5226. Can you tell the Committee where there is, in your idea, a properly constructed grating in a tail race which would be available under all circumstances and all conditions of water?—No.

5227. You have never seen one yourself?—No; I think there would be more trouble about tail races than anything else, in my experience.

5228. Ought one to be put at your tail race, do you think?—No, it is not required there because it does not go into a salmon river.

5229. Where does it go in?—It goes under the river into a canal. The salmon could come in with a flood, and have done so occasionally, but there would be no necessity for protection in my case; I only remember two salmon coming in during the last few years.

5230. Do they avoid it?—They pass up the river. They only go in at floods, and the water of the river is larger than in the tail race in flood.

5231. Is it not generally larger than in the tail race?—No; a tail race would be larger than

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Mr. Macartney—continued.

the river when the mill takes all the water of the river, and it would then attract all the fish.

5232. In what months of the year does the race generally take all the water of the river?—In the spring months, and in a dry autumn it would, and all through the summer it very often does.

5233. And at that time, do I understand you, the fish would not be ascending?—The spring fish are running up.

5234. I understood from you that the fish run up in August?—That is the spawning fish, but the spring fish are running up. In the Black-water they are running up all the year round, but the spring fish begin to run up in December.

5235. Do you mean to convey to the Committee that when there is no flush of water in the river salmon move?—No, they do not in low water. They lodge in pools, they wait for a fresh; but a very slight fresh will move them.

5236. You will agree, I should think, that when there is no flush of water they will not move?—It depends on the river altogether, and the nearness to the tide, and many other things; but when the water is, say, at summer level the fish will very rarely move. They will go on at night very often, but they will not stir in the day; even the changing of the clouds in the sky will make them stir.

5237. Even without any alteration in the volume of water?—Yes, a lowering sky will very often move them.

5238. Mr. Seaton-Kerr asked you whether some difficulties might not arise under my Bill with the millowners because you could not enter upon their lands. What is your idea about that; there is nothing to prevent you entering on the land, is there?—Unless we have powers to do so we cannot.

5239. Have you not powers to do so at the present moment?—I do not know what powers we have.

5240. My Bill does not interfere with your powers; have you, or have you not, powers to enter?—I think the inspector has powers to enter.

5241. If you do not know I do not want to press you?—The fact that the board's inspectors have power to enter on the lands gives them no authority to anything.

5242. Do you mean to say you have no powers now; if you are putting that forward as a matter of fact, I want to ask you what you know about it, but if you do not know the law upon the question I will not pursue it?—I do not know the law about it.

5243. Is your objection on the question of costs material; do you object to those clauses of my Bill on the question of cost?—The question of cost is a very grave objection.

5244. As grave as the question of principle?—Yes.

5245. And I presume it would be quite as grave with the other proprietors of salmon fisheries?—Yes.

5246. They do not wish to put their hands into their pockets to protect their own interests, do they?—If we had to protect all the rivers in our district it would swamp the board for years.

Mr. Macartney—continued.

5247. Would it swamp the salmon fishery proprietors?—I do not think it would be fair to ask the salmon fishery proprietors to put their hands in their pockets.

5248. Are your fisheries profitable fisheries?—Yes, of course they are.

5249. Would you have any objection to tell the Committee what is the gross annual value of the fish from your fishery?—I have an objection.

5250. And you would prefer, would you not, to supply them with a table for the last ten years?—No; I prefer not.

Chairman.

5251. You can tell us the annual value of the fisheries, and what rent you pay?—Our poor-law valuation is 500 L.

Dr. Tanner.

5252. Do you not pay a rent of 800 L. a year for your fisheries?—We pay a rent of 800 L. a year.

Mr. Macartney.

5253. But you object to give us the gross annual value, do you?—Yes.

Dr. Tanner.

5254. Is it a fact that the statement which has been frequently made in Mayo and Lismore to the effect that you made 2,000 L. a year out of your fishery is not true?—It is not true. If all fishery proprietors and all millers were to give their returns I should not have any objection to answer the question, but I do not see why I should be singled out as one. I objected at a previous Committee to answer the same question.

Mr. Macartney.

5255. I do not want your profits; I want to know if you will tell the Committee the gross annual produce of your fishery?—I object to give any estimate about the fishery.

5256. Do you object to give the number of boxes or number of pounds you realise?—I could not do it.

5257. I am only putting to you what has been put by other Select Committees, and asking you for statistics, but I do not wish to press the subject if you decline to answer. Your view is, then, is it, that you, as a fishery owner, are entitled to call upon the people engaged in another industry to pay for the protection which is afforded, and which develops your industry?—I think they have no right to destroy one industry for their own benefit, and I do not see that it will be hard on any miller if he has to afford this protection, because he must put up some sort of grating, and might as well put up one which protects our property as well as his own.

5258. But if the one which protects your property destroys his, what do you say?—I deny that.

5259. But we have the evidence of several millowners to that effect. You have no experience of turbines, and never worked them yourself,

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Mr. FOLEY.

[Continued.]

Mr. Macartney—continued.

yourself, have you?—But I understand the working of them.

5260. Do you admit, as a millowner, that if you put an obstruction in the water leading to a hydraulic motor, it may have the effect of diminishing the power of that water?—It will have the effect of either bursting the banks, or if the thing gets choked, it might back the water up his weir, but there is no reason why he should not keep it clear.

5261. I am putting a much simpler question than that to you. Without taking into consideration any question of *débris*, or anything of that kind, if there is a way of water coming down to a hydraulic motor, can you put obstruction in that water without diminishing its power?—It will not necessarily diminish it as long as the quantity of water goes to the turbine; it does not matter how it goes.

5262. And at what pace?—The velocity of approach does not affect it.

5263. In your opinion the velocity of water to a turbine does not affect the matter in any way whatever?—It does not.

5264. Do you say that the power of a turbine does not depend on the number of cubic feet of water which can be passed through it at a certain time?—It does depend on that altogether.

5265. Then, supposing you put certain obstructions in a mill-race feeding a turbine, which diminished the velocity of the water passing into the turbine, will not that diminish the power of the turbine?—No, because the obstruction you put in will raise the head of water above it, and it will discharge the same quantity with a higher raised head, and let the actual quantity go to the turbine as before.

5266. But supposing you take a case where the obstruction does diminish the velocity of the water; I am on the velocity of the water?—The velocity of the water has nothing to do with it.

5267. Do you say the velocity of the water has nothing whatever to do with the working of a turbine?—The velocity of approach has nothing whatever to do with it.

5268. Do you say that the power of a turbine does depend or does not depend on the number of cubic feet of water which you can pass through it in a certain time?—It depends altogether on it.

5269. Then supposing you diminish the velocity of the water coming to that turbine, will that not diminish the number of cubic feet of water passing through it?—No.

5270. Not?—No, because you increase the area to pass it through.

5271. I am not talking of increasing the area, I am taking a mill-race or taking the pipe which feeds the turbine. Supposing the velocity of the water going through that feed pipe is diminished, will not that diminish the power of the turbine?—Yes, but where will the water go to?

5272. Will it not diminish the power of the turbine?—I do not understand the question.

Mr. Toulminson.

5273. What a turbine requires is to get a good amount of water in a certain amount of time, is it not?—Yes.

Q.80.

Mr. Toulminson—continued.

5274. Then if anything stops the amount of water going through, what happens?—Then it must back up the mill-race and increase the head.

5275. That would not follow. If you put an obstruction in which prevents the water coming to the turbine, of course the turbine cannot work, can it?—Certainly it will not.

5276. It is not a question of velocity, but a question of quantity of water?—Yes.

Chairman.

5277. The evidence, I understand is, that if you allow a sufficient quantity of water, that is enough, the turbine is not dependent on the velocity of the water?—Quite so, as long as you can get a full volume that is enough.

Mr. Macartney.

5278. Now, with regard to the American weed, in your opinion you say the American weed does no harm at all to salmon; do you wish to convey that impression to the Committee?—I do not think it does.

5279. Are you aware that Mr. Frank Buckland was of opinion it was most injurious?—Yes.

5280. Do you differ from him in that?—I do. In many cases the American weed does not grow where the fish are bred, which is mostly in the rapid streams. I have never seen it growing in rapid streams, but only in backwaters, and such places.

5281. Even as regards backwaters, you do not agree with Mr. Frank Buckland, I understand?—I do not.

Mr. Pinkerton.

5282. Are you of opinion that all the expense of providing the safeguards should be put on the millowners?—Yes.

5283. How do you justify that?—I do not see why they should destroy public property.

5284. That is exactly the contention of the millowners; they do not see why you should interfere with the development of certain industries in Ireland?—I hold that we are not interfering with them. I think the two industries can go very well together.

5285. Would not you think it right that a certain percentage of the gross earnings of the Irish fisheries should go towards providing these safeguards?—I do not see how that is to be levied. Do you mean a tax on produce?

5286. It is not in every case that every man is so reticent with regard to profits as you seem to be?—Do you mean a tax on produce?

5287. Yes; you know the quantity of exports from Ireland, I suppose?—Yes.

5288. Then you take one per cent. on the gross exports?—That would be very good if you could levy it, but I do not see how you could levy it. It would be in the nature of an income tax.

5289. Would not you be in favour of dividing the cost of erecting these safeguards between the millowners and owners of fisheries?—No, I would not, for the whole public would have to be taxed.

5290. Do you think all the concession should be on the part of the millowners, and none

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Mr. FOLEY.

[Continued.]

Mr. Pinkerton—continued.

on the part of owners of fisheries?—The owners of fisheries are not the only individuals concerned; they are only a small body, compared with the general public.

5291. But they are the interested individuals in this case, are they not?—But the general public are interested too.

5292. How?—The poor people who live by it.

5293. Can you give us the number of men employed in the salmon fisheries throughout Ireland?—I could not.

5294. I thought you promised to give that to us?—I only referred to my own district.

5295. You are quite aware that the men engaged in the salmon fisheries during the three or four months in the year are a very small number, are you not?—It is longer than three months. It lasts in our river, as to net-fishing, from February to July, but the men have to earn enough then to keep them for the rest of the year.

5296. Are you aware that the number of men engaged are a very small number as compared with those engaged in these mills?—Yes, certainly. We do not want to interfere with the mills.

5297. You have no practical experience, have you, of the working of turbines?—I have had practical experience, but not in connection with salmon fry.

5298. Have you ever seen any experiments carried out of passing fry or smolts through them?—No, but I have had a good deal of information about it.

5299. Your evidence is completely contradictory to Mr. Hassard's, is it not?—No.

5300. Mr. Hassard said it was impossible for the fry to pass through a turbine without being killed?—Through one species of turbine I think he said.

5301. Then he said, did he not, they were all alike and similar in construction?—No; he said similar in principle but not similar in construction. They vary in construction, but the principle is the same.

5302. Your evidence is to the effect that a number may go through safely, but a certain percentage would be killed?—Yes; and then when it comes to a series of turbines on a river the probability is no fish will get through at all.

5303. Then it is the worse for the smolt?—Yes, it is very bad for the smolt.

Dr. TANNER.

5304. Have you seen those gratings at the Cork Waterworks?—Yes.

5305. You have described them as vertical bars three-eighths of an inch apart?—Yes, that is about it.

5306. How long have they been up?—I think in March last they were put up for the first time; they had before then this class of thing which we see here.

5307. Do you know that fish have been destroyed at the Cork Waterworks?—I have heard of fry being destroyed.

5308. Have you heard also of mature fish being destroyed there?—Mature fish are bound

Dr. TANNER—continued.

to be destroyed if going through a turbine; there is no chance for them.

5309. Do you think that the size of those gratings at the Cork Waterworks is sufficient to protect the fry?—They are quite.

5310. Is there no complaint about the flow of water there?—I understand from Mr. O'Toole there is no obstruction at all.

5311. Mr. O'Toole, to your mind, would be a valuable witness, would he not?—I certainly think so. I saw the working there, and there was no head above the grates; the water was perfectly level flowing through.

5312. Is that the only turbine on the River Lough?—I do not know; I am only speaking of the Blackwater. Of course, there may be others on the Lough, but I do not know of any.

5313. You object to tell us the value of your fishery, do you?—Yes.

5314. You do not object to tell us the number of fish that were killed at your fishery last year, do you?—I do not know the number.

5315. Can you supply us with the number?—I could later on; I could not do so now.

5316. These fish are usually disposed of in the English market, I suppose?—Yes, at London, Liverpool, Manchester, and Birmingham.

5317. Could you tell me what is the value of the fishery at Carrigrohilly, on the Blackwater?—I know the valuation is 300 £. It is George Montgomery's fishery.

5318. Is it not a fact that he let that fishery to the Duke of Marlborough on several occasions?—He let it to some Lord Lieutenant; I believe it was the Duke of Marlborough.

5319. And he got a very large sum for it, did he not?—Yes; the house went with it, I believe. It is a very valuable fishery, no doubt.

5320. About what would be the value of it?—I have always heard that it clears somewhere about 800 £, but I know nothing about it.

5321. Then is not Captain Barry's fishery very valuable?—Do you mean the Kilbarry fishery?

5322. What is the value of the Kilbarry fishery?—I do not know.

5323. Is it not a fact that these riparian proprietors on the banks of the Blackwater, notably the proprietors between Lisnora and Mallow, get large sums of money for their fisheries?—They get large sums.

5324. The value of these fisheries is considerable, is it not?—Yes.

5325. Would you consider the fisheries on the Blackwater between Lisnora and Fermoy more valuable than those between Fermoy and Mallow? They are of more value naturally, because they get the pick of the fish there.

5326. As you go up the river the fisheries become of less value, do they?—Yes; taking it mile for mile, they are.

5327. Is it a fact that the fishery of Castle Island, 20 years ago, was very valuable; and that it is practically valueless or of comparatively little value at the present day?—I have heard those statements, but all the fisheries have been good this year. There is none in the market; they are all let, and well let, too, I believe. They complain

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[Continued.]

Dr. TANNER—continued.

complain of their value falling off, but I do not think they have very much to complain of.

5328. You have told us there is one turbine on the Finnore, near Mill Street?—Yes.

5329. That is for the purpose of raising water from a quarry, is it not?—Yes; pumping water out of a quarry.

5330. Can that turbine in any way damage the fishery?—Yes; the Finnore is a spawning river, and the fry is killed by it.

5331. Has complaint been made of their being killed?—Yes; the man was threatened with prosecution if he did not put up gratings.

5332. But the turbine is for the purpose of pumping water out of the quarry, is it not?—But it is driven by a stream.

5333. Does it take up all the water of the Finnore?—I do not know.

5334. You have also told us, as to the American weed, that it really does no damage to the fish?—I do not think it does; I never saw any signs of damage done to them.

5335. Do you know a small river called the Owesbin?—No, I do not.

5336. Do you know where Coolmore is?—Yes, on the Carrigline.

5337. That is on the Owesbin; now you know, perhaps, where it is?—Yes.

5338. Do you know that that river is covered with weed?—I do not know anything about it.

5339. Would you be surprised to hear that, that having been a good salmon river in the past, there are now no salmon to be found in it?—If the river itself is choked with weed it possibly may prevent salmon ascending it, but that is not the case in the Blackwater.

5340. How many licenses do you take out in connection with your fishery, may I ask?—The value of our licenses represents 27*l.* 10*s.* every year.

5341. How many licenses is that?—Four draught nets and crib and pole, a snip net, and a cross line.

5342. You have one of the cross lines, have you?—Yes, we have one.

5343. How many licenses do they take out at Caryville; I suppose that is the next best to your own?—It is one of the best rod fisheries. Ours is practically a net fishery; rod fishing is no source of income to us. As to the licenses taken out at Caryville, I believe George Montgomery is not entitled to deduct the 10 per cent. valuation, except for the licenses taken out by his servants. Parties coming there have to take out their own licenses, and to pay for them.

5344. Are you aware of the fact that the bed of the Blackwater is stated to have changed considerably?—No; it is not materially changed as to the part I know.

5345. In the evidence that was given in the case that was tried in the year 1868, between the Lisnore Board of Conservators and the Duke of Devonshire, was there not a statement made at that time to the effect that the bed of the river had changed?—That is with regard to the silt. Of course, the effect of making the Queen's Gap altered the bed of the river materially, but since then there has been very little alteration.

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Dr. TANNER—continued.

There is a slight alteration about a mile below the Lisnore Bridge.

5346. What is the average depth of water at the Queen's Gap?—In ordinary water?

5347. Yes?—I suppose the summer level would be about a foot and a half or 15 inches.

5348. Is the Queen's Gap in the deepest part of the river?—You cannot tell where is the deepest part of the river, because there is a great hole underneath the gap; it is on the average bed.

5349. Does it permit the passage of fish in all states of the river?—Yes, if there is nothing to impede them.

5350. Then it would be wrong to say that your killing hatch is situate over the deepest part of the river?—The level is the same; it is the average bed of the river that regulates it.

5351. I suppose you are aware of the fact that there are very grave complaints made against your fishery?—I am very well aware of the fact.

5352. Is it a fact that the Duke of Devonshire exercises the right of net fishing in the fresh water for four miles above Lisnore Weir?—Yes.

5353. Do you think that in any way tends to prevent the fish passing up the river?—No.

5354. Have you that right?—We have the right, but we get very few fish there.

5355. You are not in the habit of fishing on Mondays with these nets, are you?—Yes.

5356. Do you get a better take on Mondays?—Mondays and Tuesdays are the best days, because the river is clear below.

5357. Fishing is not pursued on Sunday on the Blackwater, is it?—No.

5358. Is it not the fact that these fish pass up the river and get into some of these large holes above Lisnore, and then are swept up on Mondays?—That is not the fact.

5359. You are aware of these allegations that have been made against your fishery, are you not?—Yes; that is not a fact.

5360. Still you get a good many fish, do you not?—No, very few. We only got perhaps once a fortnight, and then only when we think there has been any quantity of fish running. But there might be hundreds of fish running on the Sunday, and on the Monday we would only get one or two. We only got two last time, and there was any quantity of fish going up on Sunday. They do not lodge with us; they run. Fishing above the weir is practically of very little value.

5361. Are you aware that the Water Conservators in Cork are in a chronic state of financial difficulty?—I believe it is so.

5362. And it is the same on the Blackwater, is it not, but perhaps not to the same extent?—No; we have economised to the extent of getting out of debt.

5363. How did you economise; in what way did you do it?—By not putting on so many baillies as was done by Franks.

5364. You did not try to protect the river?—We tried to protect the river as much as the funds would allow us.

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5365. You

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[Continued.]

Dr. Turner—continued.

5365. You put on fewer bailiffs?—We had to economise, and get out of debt. We had to save a little each year, and we are now out of debt.

5366. Are any subscriptions given by the owners of these valuable fisheries on the Blackwater at the present time?—No, none.

5367. Do you know anything about the Cork Board of Conservators?—No, I do not.

5368. Would it surprise you to hear that they give nothing?—It would not.

5369. Would it surprise you to hear that very grave complaints have been made by the Fishery Board in Dublin on that particular point?—I can well understand that.

5370. And that the proprietors of fisheries never give anything?—Quite so.

5371. And that they call upon the coastguards and police to do the work of bailiffs?—I am aware of it.

5372. You say that 760 men are relying for their livelihood on the salmon fisheries of the Blackwater, I understand?—Yes, practically, about that number would be directly relying upon them.

5373. Do you include amongst that number the fishermen of Ballycotton?—There are very few at Ballycotton. The sea fishermen are prin-

Dr. Turner—continued.

cipally at Knockadoon, which is the great place for the coast fishing.

5374. Have the fisheries in your bay deteriorated in any marked degree in the last five years?—I do not think so; the men will tell you so, but from my observation they have not; so far as I can see, they have not deteriorated.

5375. Has the fishery at Lismore deteriorated much?—No, it has not.

5376. Still you are aware of the fact that above Lismore, in proportion as you ascend the river, so complaints arise of the fisheries having deteriorated, are you not?—Complaints arise, and possibly above Caryville, there may be just cause for them; but from Caryville down, there is no deterioration, I think, taking the average of years. They may have had years and good years, and they have had good years lately.

5377. Do you know Mr. John Bolster?—Yes, I do.

5378. He is a professional angler, is he not?—Yes.

5379. Do you know Anthony Burn as being a professional angler?—No.

5380. Are you agent for the Duke of Devonshire?—No, I am lessee of the fishery.

5381. Are you in no way agent or sub-agent for him?—No.

Mr. JOHN McDONNELL, called in; and Examined.

Mr. Seton-Karr.

5382. I BELIEVE you are foreman at the Newry Frydery, are you not?—Yes.

5383. Where is that?—It is in County Armagh.

5384. Are you well acquainted with the manufacture and erection of turbines?—I have erected some of them myself, and got several others erected from the Newry Frydery.

5385. You have superintended the erection of a good number, have you not?—Yes.

5386. Can you mention any turbines that you have erected lately?—Yes.

5387. Specify a few?—For instance, I erected two for Messrs. Goodbody, in Clarn, King's County.

5388. On what river is that?—On the River Brosnagh.

5389. Is that a salmon river?—It is a river that rises near Mullingar; Belvedere, I believe.

5390. What other turbines have you erected?—I erected another one in County Armagh; Mr. Kirk used to own the place, but he does not own it now.

5391. On what river?—The name of that is the Callan Water.

5392. Is that a salmon river?—I do not think salmon come up there.

5393. What sort of a mill was it?—It is what is called a beetling mill, for finishing white linen.

5394. Have you erected turbines at mills situate on salmon rivers?—Yes, I think salmon comes up the Brosnagh, but I have not seen any.

5395. Are there any others?—Yes, at Dundalk; I do not know the name of it, but there are salmon there.

5396. What river would that be?—I do not know, that is in County Louth.

Mr. Seton-Karr—continued.

5397. Have you any knowledge of salmon fry having been killed in turbines?—I never saw salmon fry being killed in turbines.

5398. Do you know of injury being done to salmon fry by turbines?—I believe they have been killed in turbines, and I know they could be killed in turbines.

5399. What reason have you to believe that they were killed in turbines?—Because there is no way in which they can escape; if they are mixed in the water they are bound to be killed.

5400. There is a model of a turbine in front of you?—That is one I am not familiar with.

Mr. McCarthy.

5401. What sort of a turbine is that one?—I do not know; it is a new make to me.

Mr. Seton-Karr.

5402. You say you have reason to believe fry have been killed in turbines?—Yes, I have.

5403. Can you give us any facts in support of that?—I took fish out of a turbine myself.

5404. Where?—At Messrs. Goodbody's. It was eels that I took out of that.

5405. Will you describe in what condition you found the eels?—I found an eel had stuck the snout, and they could not move it.

5406. Did they send for you to put it right?—They did; they did not know what was wrong, and that was what was wrong. When I opened the turbine the head of the eel was on one side of a bucket, and his tail the other side.

5407. Was the eel seriously injured?—I think he had been there three or four days; he was dead.

5408. The turbine had killed the eel, had it?—Yes.

5409. Was

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Mr. McDONNELL.

[Continued.]

Mr. Tomlinson.

5409. Was there only one eel in it?—There were two or three, but it was a larger one which was the principal cause of stopping the gate from shutting.

Mr. Seton-Karr.

5410. Do you think that fry could not go through a turbine with safety?—They might pass through some turbines, but none that I ever knew. They would not pass through a Leffell nor a M'Adam.

5411. Do you think they would get killed?—They would. They might escape in a Leffell wheel, because there is, I dare say, half an inch between the point of the bucket and the guides.

5412. Is that all the space they would have to pass through?—They would not have much more.

5413. Could a fry pass through a quarter of an inch aperture without being killed?—No, he could not.

5414. I suppose it would take much less to kill a fry than to kill an eel?—Yes.

5415. Would a blow that would kill a smolt hurt an eel much or might it not hurt an eel much?—Might not.

5416. It would take a slight blow to kill a smolt, would it not?—A slight blow would not kill an eel.

5417. Do you know anything about salmon smolts?—I cannot say I do.

5418. Do you know of any turbines which are protected by fry-guards or smolt-guards?—I do not.

5419. Are you not acquainted with any fry-guards?—I am acquainted with guards upon turbines for keeping them clean.

5420. What sort of guards?—They are what we would call racks, with parallel bars a quarter of an inch by an inch and a-half.

5421. They are put up by the millowners, are they?—Yes, to save the turbine.

5422. They do not keep fry out, do they?—I do not know that there is fry in the water which I know those to be in: that is, the Bannwater.

5423. Where?—At Mr. Euprichard's mill, beside Bann Bridge.

5424. What kind of a mill is that?—A bleaching mill.

5425. Worked by a turbine?—Yes.

5426. Have you known salmon fry go through that turbine? I do not know that there is salmon in that river; but I know they could not go through as long as it is in good order.

5427. But you do not know of your own knowledge whether fry have ever gone through that or any other turbine, do you?—I do not.

5428. All you know is that you have erected turbines, and you do not think fry could get through them with impunity; that is your evidence, I understand?—Yes.

5429. I dare say you have listened to some of the evidence before this Committee, have you not?—Yes.

5430. Do you think it is possible to erect a guard that will keep fry out of the turbines and will not interfere with the working of the mill?—I think it is possible to keep anything that is 0.50.

Mr. Seton-Karr—continued.

larger than 5-8ths of an inch or half an inch out, and not injure the working of the mill.

5431. What kind of guard would you suggest as the best guard?—I have a small one here (producing same).

5432. Do you think this kind of guard would not interfere with the working of a mill?—I think not.

5433. What would be the distance of the openings?—Three-eighths of an inch.

5434. You said 5-8ths of an inch just now, I thought?—Well, I kept myself in bounds; 5-8ths will not go through 3-8ths; if it was 3-8ths it might go through.

5435. The guard which I hold in my hand is 3-8ths of an inch, is it?—Yes.

5436. This is a full-sized model is it, of the grating you would propose?—Yes; a grating like that I have known to do its duty well.

5437. Where?—At Euprichard's.

5438. At what mill?—On the Bannwater.

5439. Are there any salmon there?—No, but there are eels.

5440. At all events no fry could get through that guard, could they?—I do not know.

5441. How long has this guard you speak of been up there?—Twenty years.

5442. It is put up to keep the eels out, is it?—It was put up to keep the turbine clean.

5443. From what?—From leaves and other rubbish.

5444. And eels?—All I can tell you is, that when it was broken and the water-wheel was stopped, you would get eels cut up in pieces below the wheel, but as long as it was in good order there would be none.

5445. You say it has been put up 20 years?—Yes.

5446. Have you ever heard any complaints about its interfering with the working of the mill or the flow of the water?—No; and I have spoken to a man who was constantly there, and had been there for 14 years.

5447. What did you hear from him?—He said he had never seen any defect from it in the working of the mill.

5448. Do they often send for you to put it right?—No, they do not.

5449. Do they have much trouble in cleaning it?—Not much of trouble; there is a rake made for it that draws the leaves up.

5450. In the real article are those round pieces so close together?—No, they are two feet apart.

5451. Is this grating ever taken out to be cleaned?—Yes; it is made in sections.

5452. Do they ever have much trouble in cleaning it, do you know?—No; they have a rake with short points on it which go between those things and pull up the leaves to the surface.

5453. Did you erect this particular turbine?—No, that is a M'Adam turbine.

5454. Is it a good turbine?—Yes, it is not a bad turbine; it is a very good turbine.

Mr. Tomlinson.

5455. Have you put up gratings of that kind anywhere else than at Mr. Pritchard's?—Yes.

A A 4 5456. Where

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Mr. McDONNELL.

[Continued.]

Mr. Tomlinson—continued.

5456. Where else?—At Kirk's or Bowden's. I think that is the name of the man who owns the mill.

5457. How long ago is that?—Twelve months ago.

5458. Is that working satisfactorily?—Yes.

5459. Have you heard no complaint about it?—No.

5460. Where is it put up, at the head-race or where?—Just above the wheel at the mouth of the trough.

5461. Is there any other grating at the head of the race?—Yes, I believe we put a perforated plate below that.

5462. Just on the turbine?—Just immediately above the turbine or down pipe.

5463. Whose turbine was that?—It is a Burnham's American turbine.

5464. When did you put the perforated plate there?—Shortly after the turbine was put up, about a year ago. I did not put it in myself, but I was in the shop when it was done.

5465. Have you heard anything about the perforated plate since it was put up?—No complaint.

5466. Is it still there as far as you know?—Yes, I believe it is.

Mr. Macartney.

5467. What is the diameter of the holes of the perforated plate?—About 5-8ths of an inch.

5468. That would be necessary in your opinion to let the water through, would it?—I think it would to the best of my belief; and it is 5-8ths solid.

5469. You know nothing about salmon fry, do you?—No, I do not.

5470. You do not profess to know anything about them?—No.

5471. Your only experience of a turbine being stopped, has been with eels, has it not?—Yes.

5472. What was the size of the eel you got?—About 2 inches diameter.

5473. And what length?—Two feet 6 inches perhaps.

5474. Are you well acquainted with turbines?—Yes.

5475. Do you know all the varieties of them?—Not all the varieties.

5476. Do you know the special points of difference between the M'Adam and the Leffell?—I do.

5477. Are you aware that the M'Adam turbine has to be protected much more effectually than a Leffell?—I will agree to that.

5478. For the sake of the millowner himself he would be obliged to protect the M'Adam, would he not?—Yes.

5479. Do you agree with the evidence we have had before the Committee that the M'Adam is not much used now, and is not one of the popular turbines which you would put up?—It is not.

5480. Is it out of date?—Rather.

Chairman.

5481. You know the working of the turbine, do you not?—Yes, I do.

Chairman—continued.

5482. Do you know what the action is, and the inside of that casing?—Yes.

5483. Is it your opinion from your knowledge of that working, that a small fish, such as a smolt or young salmon, or what is called fry, could not pass without being injured?—My opinion is that they could not; they may get one in a hundred through without being injured.

Mr. Seton-Karr.

5484. Why do you say you made these spaces three-eighths of an inch apart when you say five-eighths would be sufficient to keep out eels, and also would not interfere with the flow of the water?—I mean to say that a fish five-eighths in diameter would not pass through that.

5485. But, you were asked what size you think the grating or guard should be, and you said five-eighths?—I did not mean that.

5486. This thing is three-eighths, is it?—Yes.

5487. And it is certain that this never interfered with the working of that particular mill, is it?—No; it never interfered at Mr. Euprichard's.

Mr. Macartney.

5488. What kind of turbine was it there?—It was a M'Adam.

5489. What kind of a turbine was it where the perforated plate was put in?—That is a Burnham.

5490. Is there any difference between that and the M'Adam?—Yes, there is; the water acts outwardly on the one and inwardly on the other.

5491. Which requires the most water?—I do not know, I am sure; I think it is according to their size; a same size Burnham would use more water, but it would be more powerful.

5492. Could you put a grating like that in front of a Burnham?—Yes.

5493. And it would not interfere with the working of it at all, would it?—It would not.

Mr. Tomlinson.

5494. Have you a drawing of a Burnham here?—I have.

Mr. Pinkerton.

5495. What would be the cost of erecting a grating of that description?—That would not be a very dear grating; I think it is owing to the different situation; of course, the larger it would be the more expensive it would be.

5496. Supposing it were erected in front of a 100-horse power machine?—It all depends on the fall.

5497. But, according to the evidence, the rapidity of approach has nothing to do with the driving power?—No doubt; but we can pass water through a 12-inch pipe sufficient to develop 100-horse power if we have fall enough, and we must take a pipe six feet in diameter on a 10 foot fall, or something of that sort.

5498. Do

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Mr. McDONALD.

[Continued.]

Mr. Seton-Karr.

5498. Do you think that the use of turbines will largely increase in the mills in Ireland?—I believe they will.

5499. They are a much better power than any other kind of wheel, are they not?—I do not say that, but they are cheaper first cost.

Mr. Pinkerton.

5500. Do you mean to say that they are not the best motors driven by water?—I do not mean to say anything of the kind.

5501. What have you got better than a turbine?—A well-constructed breast-wheel; a

Mr. Pinkerton—continued.

breast-wheel, it appears to me, is as good as any turbine.

5502. Would you have as steady a drive with a breast-wheel as with a turbine?—You would.

5503. That has been contradicted by every engineer who has given evidence before this Committee?—That is my experience.

Mr. Seton-Karr.

5504. You want more water, do you not, with a breast-wheel to get the same power; is that what you mean?—In my opinion, no more is required.

Friday, 13th May 1892.

MEMBERS PRESENT:

Sir John Whittaker Ellis.
Mr. Macartney.
Mr. Pinkerton.

Mr. Seton-Karr.
Mr. Tomlinson.

SIR JOHN WHITTAKER ELLIS, BART., IN THE CHAIR.

Mr. G. R. BODNER, called in; and Examined.

Mr. Seton-Karr.

Mr. Seton-Karr—continued.

5505. You are a civil and mechanical engineer, I believe?—Yes.

5506. And are you an associate member of the Institute of Civil Engineers?—Yes.

5507. Have you had large experience in the construction and design of turbines?—Yes, I have made a special study of turbines; I am the author of a work on the subject and have been consulted on various occasions with respect to turbines and have designed them.

5508. How long have you made them a special study?—Five or six years, but I have been acquainted with them much longer than that.

5509. You say you have often been consulted with regard to them?—Yes.

5510. Will you kindly tell the Committee the different kinds of turbines there are?—As regards their construction there are what are called Radial inward-flow turbines, Radial outward flow turbines; Axial or Parallel-flow turbines, and Mixed-flow turbines.

5511. Is that model which we have had produced, here?—Yes, that is an inward-flow turbine; that description refers more particularly to mechanical construction. Then as regards the method in which the water acts, there are, broadly speaking, two systems of turbines, which are known as Reaction and Impulse turbines. The chief distinction is that in the Reaction turbine it is essential that all the buckets which are in action should be quite full of water; whereas in the impulse turbine, air is admitted to each of the buckets; that is to say the water only flows in a comparatively thin stream over the vanes.

5512. Are those opening which we see on the model the buckets which you are alluding to?—Yes; you see the spaces between the vanes of the wheel; those are termed buckets.

5513. Your distinction is, that in one case these buckets must be full of water, and in other cases it is not necessary?—Yes, and in other cases it is not only not necessary, but it is absolutely disadvantageous. In principle there is a difference in the action, but as far as the mechanical construction is concerned there is very little difference. There is no essential difference between the impulse and reaction tur-

bines, but there is a difference in the way in which the water acts in them.

5514. Which are the most modern kind?—The impulse turbines are considered the most modern kind, but both are used; they are applicable in different cases.

5515. Are the impulse turbines those in which the buckets need not be quite full?—In fact they must not be quite full.

5516. Are they the inward radial-flow turbines?—They may be of any of the kinds first described. That description only refers to construction, and it is applicable to both of the systems. You will understand perhaps better what I mean if I show you a drawing of an impulse turbine. This is a parallel or axial turbine. These represent the vanes of the wheel.

5517. Is this drawing (*describing drawing*) full sized?—Yes, this is full sized. This portion coloured green represents the stream of water; in the reaction turbine the whole of this space between these two vanes would be filled with water, whereas in the impulse turbine it is so arranged that only a comparatively shallow stream flows over each bucket as shown here.

5518. And runs out on this side?—Yes, it runs out below.

Mr. Tomlinson.

5519. What is that?—Those are holes for ventilation in the sides of the casing to admit air. It is essential that air should be admitted to the buckets in this type of turbine, so that there may be atmospheric pressure in the bucket. This is only a portion, of course, of the whole circumference.

5520. But this would come close up to there, would it, or would there be a space between?—There must be a clearance. That represents it, and in that case there would be about a quarter of an inch.

Mr. Seton-Karr.

5521. Is any other turbine is that clearance space any larger?—In some American turbines they make it larger, because the sluice for regulating the admission of the water comes down between the guide passages and the buckets.

5522. Is there much difference; is it much larger; does the clearance vary much?—It may be

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Mr. BODMER.

[Continued.]

Mr. Seton-Karr—continued.

be as much as perhaps an inch or an inch-and-a-quarter in some cases.

5523. That would be the clearance which the fish in passing through a turbine would have?—They would have to go through it; although they would stand a better chance of not being nipped, they would stand an equal chance of being hit by the edges of the vanes as the wheel went round.

5524. You have mentioned the names of four different kinds of turbines, and also the two classes, in one of which the water does not fill the buckets, and the other in which it does?—Yes.

5525. Is there any other material difference which it is important for the Committee to know?—I think not, in turbines, generally. With the view of amplifying what was stated by Mr. Haasard, I constructed a sort of model showing the way in which the fish would pass through a turbine. It may make the matter a little clearer. This (*producing model*) represents a string of fish. About the most favourable position in which a fish could be to escape being nipped is somewhere about where that one is. This model is made to scale. The fish are four-and-a-half inches long, and the pitch of the vanes is four inches, which would be the average proportion of a three-foot wheel of radial inward flow.

Mr. Macartney.

5526. What construction is it, American or French?—That would be American. The inward flow is of various constructions; this would be of an American type originated by Francis. You will see the fish have a very good chance of being nipped as they come in. That fish is in about the best position possible for escaping, and with a very big pitch he might have a chance of escaping. You see his tail is being nipped now (*demonstrating*).

Mr. Seton-Karr.

5527. He would have to turn a little in order to avoid being nipped, would he not?—Yes, the water, it was stated in one case that was mentioned, flowed in with a velocity of 40 feet, but that is not quite correct. As a matter of fact the velocity of the water is about the same as that of the wheel for that type; that is about 18 miles an hour. That might give a better idea to some members of the Committee than stating it in feet per second.

Mr. Tomlinson.

5528. The fish would remain in the centre of the water, would they not?—Not necessarily.

5529. They would be light, would they not, compared to the water?—That makes it worse for the fish, because he has rather a less chance of escaping in the centre of the stream.

Mr. Macartney.

5530. What scale do you make this to?—That is the clearance; one-quarter of full size, about three-eighths of an inch, in fact rather more.

5531. To that scale?—Yes, to that scale.

0.80.

Mr. Tomlinson.

5532. When it is set in that position, what is the width across there?—Four inches from centre to centre.

5533. Supposing these fish were going through, they would have passed through, would they not; they would not go slower than the stream, would they?—No, they would go at the same pace as the stream, and the pace of the stream in the majority of turbines of this type is about the same as the velocity of the wheel.

Mr. Seton-Karr.

5534. Do you agree with what some of the witnesses have said, that the fish go down the stream tail first?—I could not say; I have fished a good deal for trout, and I have generally seen them go head first when swimming. I do not know much about salmon, except that I have often caught these young salmon when fishing for trout, very much to my disgust.

5535. At all events that represents the manner in which they would enter the turbine, does it?—Yes.

5536. And that is the only way they would go?—Yes.

5537. And whether they went head or tail first, it would not make any difference, would it?—The strong chances are they would be nipped or hit.

5538. The risk would be very great indeed, would it?—Yes.

5539. If a fish had got safely in here without being nipped, what becomes of him then?—He would be carried out here.

5540. At once?—No, what would happen would be this: He would get into one of these buckets; he could not come quite across it, but he would be turned down like that, and as the wheel was going out he would be very quickly washed out; the actual course followed by the fish would be that (*demonstrating*), and the course relative to the wheel, this.

5541. Then he would be carried out, would he?—Yes.

5542. And there would be no more danger for him then, I suppose?—No.

5543. But the great danger is of being nipped or hit, is it not?—Yes.

Mr. Macartney.

5544. This plan which you are showing us you say is three-eighths of an inch?—Yes, I should think it would be rather more, because in cutting out it has been a little exaggerated.

Mr. Tomlinson.

5545. Is that intended to be the actual size of the turbine?—No, that is to a scale of three inches to the foot.

Mr. Seton-Karr.

5546. Besides the danger of his being nipped here, I suppose there is the danger of his being thrown by the pressure of water against some of the sides?—Yes, there would be a certain amount of risk of that.

5547. And also I suppose there would be the risk of his being drowned by not being able to get his head up stream?—Yes, of course it is a usual

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Mr. BODMER.

[Continued.]

Mr. Seton-Kerr—continued.

usual thing in fishing to drown a fish by pulling him down stream.

5548. If he goes head foremost down a rapid rush and the water is running faster than he is, then the chances are he would get drowned, are they not?—Yes.

Mr. Macartney.

5549. Do I understand you to say that he goes in head foremost?—That I cannot say; it would be impossible for anyone to see what is going on inside a turbine.

Mr. Seton-Kerr.

5550. They must either go one way or the other, must they not?—Yes, as a rule there would not be room for them to go any other way.

5551. Which kind of turbines do the mill-owners use mostly, or are likely to use mostly; the reaction or the impulse?—That all depends entirely upon circumstances. One class of turbines is suited for one set of conditions, and another for another.

5552. You are not prepared to say they are likely to use one more than the other, are you?—Generally speaking, where the head of water is moderate, or low, the quantity of water large and the supply constant, a reaction turbine would be used.

5553. In which the buckets are full of water?—Yes, in which the buckets are full of water; but in cases where the quantity of water is variable the impulse turbine would be used; at least that is what I should recommend, and what is generally recommended.

5554. Do you think there is any difference in the danger to the fish between the reaction and the impulse turbine?—I should say it was very much the same. The velocity of the water flowing into the buckets is greater in the impulse turbine relative to the wheel.

5555. That is the one in which there is less water?—That is the one in which there is less water and in which the buckets are not full of water.

5556. Do you think there would not be much difference then?—No, I think there would not be much difference. There is this to be said, that in the impulse wheels the pitch is generally a little closer, so that it would be rather worse in that respect for the fish.

5557. In the impulse wheel the pitch is a little closer, is it?—Yes; on the other hand the velocity of the water is greater.

5558. What do you mean by the pitch being a little closer?—I mean that the number of vanes in a circumference of a given size would be rather larger.

5559. Therefore each vane would be smaller, would it?—The distance between the vanes would be rather smaller under otherwise similar conditions.

5560. Imagine a shoal of fry going through or being washed through either a reaction or an impulse turbine; do you think from your knowledge of turbines that any large percentage of them would get through unharmed?—I should not think a large portion would; I think a few might, by chance.

5561. Do you therefore consider them very

Mr. Seton-Kerr—continued.

dangerous machines?—I should say they are dangerous to fish.

5562. Supposing you had two or three turbines, one below another, on the same river, what chance is there of any fry getting through them all?—I should think those who are not destroyed by the first would be finished off by the next.

5563. Then you do not agree with the evidence which has been given by the mill-owners, that the turbines do not injure the salmon smolts, do you?—I should think it was almost a mathematical certainty that they must be injured, a great portion of them.

5564. Have you yourself seen fry going through, or their dead bodies below, turbines?—No; I know what fry are like, but I have not seen them passing through turbines or in the neighbourhood of one.

5565. The millowners derive great benefit from the use of turbines, I believe?—Yes; in the first place the efficiency is greater than that of the old-fashioned water wheels, and in the next place for a given power a turbine is a cheaper motor than a water wheel. The first cost is less.

5566. I believe we have had evidence to the effect that they gain from 20 to 40 per cent. more power in the same water?—Yes, that would be the case.

5567. Do you know Mr. Gilson's turbine?—I do not. I have no local knowledge.

5568. Mr. Macartney in his evidence brought out that it was a M'Adam turbine?—Yes.

5569. What is the difference between a M'Adam turbine and these other turbines?—I believe a M'Adam turbine is an impulse turbine made by M'Adam. It is not, I believe, a special invention of M'Adam. They are a firm of manufacturers who make the "Girard," or some improved form of impulse turbine. I think I omitted to tell you that the impulse kind of turbine goes by the name of the "Girard" turbine, because a Frenchman named Girard was the first to introduce it.

5570. Then this turbine which has been alluded to as Mr. Gilson's turbine is not a particularly new-fashioned turbine, is it?—No, the Girard turbines have been in use many many years; I should think for the last 20 or 25 years at the very least. There have been improvements made in them in some respects of course, but the principle is the same.

5571. Mr. M'Adam is merely a Belfast manufacturer who makes this form of impulse turbine you are describing, I understand?—Yes.

5572. It has been stated in evidence that there is a great rush of water down the supply pipe to the turbine?—Yes.

5573. Is it not a fact that supposing there is rather more rush than usual, it means that the turbine is not working so satisfactorily or in a proper way?—I do not quite follow your question.

5574. Supposing the turbine was not working quite satisfactorily, and was not properly fixed, that would tend to increase the rush of water into it, would it not?—No, I do not know that it necessarily would; probably the water would enter in a more

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Mr. BODMER.

[Continued.]

Mr. Seton-Karr—continued.

more disturbed way. I do not know necessarily that there would be a greater rush, but there would be a greater disturbance of the water.

5575. I thought perhaps it might use more water?—Yes, if the turbine were not properly fixed or there was anything about it to make it wasteful; it would use more water in that case.

5576. Therefore it would take more water down, would it not?—Yes, it would.

5577. Therefore the better the turbine was fixed up, in one sense, the less water it would use?—Yes. If there were anything wrong in its construction it would use more water than it ought to do.

5578. Do you think that the velocity with which the smolts would be shot into a turbine would be sufficient to kill them apart from the danger of the sipping?—Yes, I should think it would in many cases.

5579. That alone, quite apart from any material injury which might be inflicted on them, you think would kill them?—Yes, as I said before, the velocity with 25 feet head would be 15 miles an hour. If you can imagine a smolt projected against the edge of an iron plate or against a surface of iron with that velocity he would stand a very strong chance of being killed.

Chairman.

5580. What is the ordinary rate of a river running?—It varies very much of course. In a flat district three feet per second would be a tolerably high speed, but in mountain streams I should think you might get as much as six feet a second and more.

5581. What would that give as represented by miles?—I suppose six feet a second would be something like four miles an hour. That is roughly speaking.

Mr. Seton-Karr.

5582. Turbines are made of all sizes I believe?—Yes, from very small to very large.

5583. What are the limits of size?—There are turbines of as much as nine feet or 10 feet diameter.

5584. I suppose they run down to smaller sizes?—Yes, they run down to six inches.

5585. What is the circumferential velocity dependent on?—It depends entirely on the head of water with a given type of turbine.

5586. The velocity of the outside circumference of the turbine, I mean?—Yes.

5587. That is dependent on the head of water, is it?—Yes.

5588. That is about 64 to 70 per cent. of the velocity of flow, is it not?—Yes, in a reaction turbine.

5589. Is there any difference in an impulse turbine?—Yes; its velocity is a little less relatively to the velocity of the water.

5590. Take a head of nine feet of water, what would the circumferential velocity be there?—It would be about 17 feet per second.

5591. Independently of the diameter of the turbine?—Yes, that is the circumferential velocity of course, not the number of revolutions; I am speaking simply of the circumferential velocity in feet per second.

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Mr. Seton-Karr—continued.

5592. The actual velocity of the water flowing between the guide vanes would be about the same I believe?—Yes.

5593. In that case it would be 17 feet per second too?—Somewhere about that.

5594. How many miles an hour would that be?—That would be about 12 miles an hour, I suppose.

5595. That is a low head, is it not?—Yes.

5596. What is the maximum head?—There are turbines working with a head of as much as 1,500 feet, but those are exceptional cases.

5597. Not in Ireland, are there?—Not in Ireland that I know of.

5598. Where is that?—On the Continent, and I know of one in London working with water from the Hydraulic Power Company's main. That is a very small one, and runs at a very high speed; it is an American turbine called the Pelton Wheel.

5599. Is that working with a Pelton water wheel?—Yes; but a Pelton water wheel is an impulse turbine.

5600. Why do they not use these Pelton water wheels in Irish mills?—They would not be at all suitable for the conditions; they are only suitable where the head of water is very great and the quantity relatively small.

5601. What is the ordinary head, taking an average Irish mill?—They vary so much; are you speaking of any particular district?

5602. Do they develop about 80 horse-power, taking, say, one in the Feyle or Bann district?

—That does not give you any criterion, because you want to know the quantity of water before you can get at the head. For instance, for a given horse-power with a small quantity of water you want a large head; with a greater quantity of water you want a less head. As I told you, I have no special local knowledge of Ireland, but, generally speaking, a moderate head would be 20 feet to 30 feet.

5603. Then I suppose we may take it for the purposes of our inquiry, that the head would vary in the case of Irish mills from 15 to 30 feet?—That I cannot say; of course that depends on local conditions.

5604. Would that be a moderate head?—Yes, that would be a moderate head.

5605. When you gave a nine-feet head it gives you a velocity of water of about 12 miles an hour; therefore, if you had about 30 feet it would give you more than three times that, would it not?—No. It would not be twice as much; the velocity does not vary directly as the head. It varies in a slower ratio. For instance, with four times the head the velocity would be twice as great.

5606. In the case of Mr. Webb's mill his head is 10 feet, I believe?—I have been told so.

5607. And the velocity would be 13 feet or 14 feet, I suppose?—It would be what I stated, about 17 feet.

Chairman.

5608. The nine feet gives 17 feet, you say?—Yes, and the 10 feet would not give very much difference. You might take it as from 17 feet to 18 feet.

5609. What would 10 feet give?—Very little more than nine feet.

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5610. In

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Mr. BODMER.

[Continued.]

Mr. Seton-Karr.

5610. In some varieties of turbine I believe the quantity of water admitted to the motor is regulated by causing the guide vanes to swivel on pivots?—Yes, as in this one for instance.

5611. What additional risk would that cause to the fish going through?—There would be a chance of their being jammed in the passages between the vanes. Supposing the turbine is not using the full quantity of water, and for any reason it has to be regulated to work with less water, the passages between the guide vanes are partially closed by turning the latter about their pivots in this particular kind of turbine, and there are others which are arranged in the same way. Supposing the quantity of water has to be reduced, the orifices of these vanes are brought close together so that they converge rapidly, and there would be a chance of a fish getting jammed there, and he would not be able to get out.

Chairman.

5612. Then the water comes into these buckets and escapes in here, does it?—It escapes into the wheels. Those are fixed guides, and the water comes out between them.

5613. The fish must get into those buckets first, must they?—Yes.

5614. And then they are shot out of those buckets through those grooves?—No, through here. The water leaves the wheel from this central space; it flows in on the outside, comes in here, and finds its way out through a pipe. This is where the water comes in; those are what are known as the guide vanes.

5615. It goes into a bucket; from that bucket it comes out to the apertures here and goes over, does it?—Yes, it has then done its work and flows on.

Mr. Macartney.

5616. A fish might possibly go straight through, might it not, even according to Mr. Hasard's evidence; in that 1-84th part of a second, he might shoot straight through these?—There is just the chance.

Mr. Seton-Karr.

5617. In that case, where these guide vanes are regulated in that way to move on pivots, you say there is an additional risk to the smolts in passing through?—Yes, in a certain position of the guide vanes they would run the chance of being jammed.

5618. Is that a common kind of mechanism to have?—It is very common with some of the American turbines.

Chairman.

5619. The principle of the turbine is this, is it, in every case?—Yes, but the arrangement differs. In some cases the water flows outwards; in others inwards.

Mr. Seton-Karr.

5620. One of the witnesses produced pieces of wood and also pieces of turpentine of that size, which had been passed through a turbine apparently without injury; do you think that that is any test of whether smolts can get through or not?—No, I think it only shows that there is a possibility of

Mr. Seton-Karr.—continued.

a few pieces out of many getting through, but I should say the chances are that it does not prove anything. As I said before, I think it is possible one or two fish might get through here and there, and one or two pieces of wood might get through. Besides, as far as I can see, this piece of wood is a good deal shorter than a fish. This piece of wood is only about three inches long.

5621. That would mean, would it not, a very great difference in the risk of going through without injury?—Yes; as I said before with a certain proportion between the length of the fish and the pitch of the vanes it is almost a mathematical certainty the fish must be nipped.

5622. In your working model I believe you have made the fish to scale nearly $4\frac{1}{2}$ inches long, have you not?—Yes.

5623. And that would be an inch and a-half longer nearly than that piece of wood at all events?—Yes.

Mr. Twiss.

5624. Are you acquainted with turbines as they are used in America now?—Yes.

5625. Does the law require there any kind of protection, or not, for fish?—That I am not prepared to say; I do not know anything about that. I have studied the turbine more from a mechanical point of view and regarding the particular construction of the machine itself.

5626. Have you heard any complaints in America of turbines having injured fish?—No, I have not been in America; but I know American turbines, and the construction of them.

5627. Are you a manufacturer of turbines?—No, I am not; I am a consulting engineer.

5628. Where is your place of business?—30, Wallbrook, City.

5629. Am I right in supposing that the Impulse system would be used where ordinarily, in the case of a water-wheel, you had an undershot water-wheel, or where you had an overshot?—It might be used in either case; it is one of its advantages that Impulse wheels are applicable to a variety of conditions.

5630. With regard to the action of fish, your view is purely speculative, I assume?—I have never seen a fish killed; it would be almost impossible to see it; you cannot see inside a turbine when working.

5631. How would the velocity of water in turbines compare with the velocity of water passing over water wheels, taking an overshot wheel?—It is very much quicker on the turbines.

5632. How would a turbine compare with an undershot wheel?—The velocity of water with an undershot water-wheel is very much lower than with a turbine.

5633. And with a breast wheel it would be about the same, I suppose?—Yes, about the same; the action is different in water-wheels and turbines; in water-wheels, the water acts by its weight, and generally speaking it is desirable to keep the velocity of the wheel as low as possible for efficiency.

5634. Apart from the question of the size of these pieces of wood, which you say are smaller than fish, your view would be that pieces of

wood

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Mr. BODNER.

[Continued.]

Mr. Toulson—continued.

wood of that size, would not uniformly pass through?—No, a few might get through.

5615. Then if it has been represented to us that the pieces of wood, and pieces of turnip which were produced here were those which had gone through a turbine, and that no samples which were injured had been kept back from us, is it your view that the experiment could not have been fairly conducted?—I should not like to express any opinion of that sort.

5636. Could a piece of wood of that kind get jammed in a turbine without stopping a turbine?—I think that in a turbine of considerable power the turbine might break the piece of wood.

5637. But if it did not break it?—It would stop the turbine.

5638. And if it was only a turbine of moderate power, what then?—It might stop it; it would either break the wood or stop the turbine.

5639. And even if it broke the wood, it might do some damage to the turbine I presume?—Exactly; such cases have occurred.

5640. Have you heard of them?—Yes.

5641. Can you give the particulars of any case?—No, I cannot give particulars, but it is a matter of common knowledge that the vanes of turbines are damaged by pieces of material getting in.

Chairman.

5642. We have had it in evidence that the turbines ought to be protected?—It is the usual thing to protect them.

Mr. Toulson.

5643. Have you ever gone into the question of the kind of protection that ought to be applied? It is generally accepted that inclined gratings are used in ordinary cases; that is general all over the continent, and all over England I think.

5644. Have you any practical experience of the kind of guards that are used?—Yes, I have seen them often enough.

5645. Have you ever seen a guard like that one which has been produced?—No, that is specially designed for keeping fish out, I understand.

5646. In your judgment would a guard of that kind interfere with the flow of water to the turbine?—Not if the apertures are made large enough. I mean if there are a sufficient number of apertures.

5647. I am talking about a guard of that kind. I presume a guard of that kind would tend to stop the flow of water to some extent?—Of course it would; if you have a limited area for the passage of the water and you put one of those guards in, it would reduce the passage, but in the majority of cases I take it there would be no difficulty in making the area, after allowing for any obstruction, sufficiently large. Of course that would have to be done.

5648. In your view as a matter of practice, is there generally a sufficient margin of water to allow for anything of the kind?—Yes.

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Mr. Macarty.

5649. You have had very considerable experience you say, with regard to hydraulic motors?—Yes.

5650. What is your opinion of the value of the turbine as a hydraulic motor?—It is a very efficient motor; one of the most efficient there is.

5651. It has given very considerable impetus, has it not, to the use of hydraulic machinery for various mechanical purposes?—It has certainly on the continent and in America. In England there are, comparatively speaking, few cases where it is applicable, but there is no doubt it is coming into use much more than formerly.

5652. What do you mean by that; that there is not sufficient water-power in England?—There is not sufficient water-power, and where there is sufficient water there is not sufficient head, which comes to the same thing. Of course the power depends on the head.

5653. But wherever there is sufficient head of water it has been largely used, has it not?—Yes, it is being used.

5654. Very considerably?—I do not know that; I should say not very considerably in this country; it is very considerably used abroad. Wherever there is water-power it is to the advantage of millowners and manufacturers to take advantage of it, obviously.

5655. You have given the Committee some evidence as to the mechanical construction and the different names as applied to the two general systems of reactionary and impulse turbines?—Yes.

5656. Do you know if any turbines are now being up on the reactionary principle?—Yes. I do not know that I can call to mind one at the present moment.

5657. As a matter of fact, would you yourself recommend one on the reaction principle?—In certain cases decidedly.

5658. What sort of cases?—In cases where the quantity of water was large relatively to the head, and the flow was pretty constant. In fact there are a few cases where I might say you must put up a reaction turbine.

5659. Do you speak from any knowledge of the trade as to whether the general tendency is now to put up turbines on the impulse principle in preference to the reaction principle?—Yes, the tendency is that way.

5660. Professor Thomson was the man who invented the inward-flow turbine, was he not?—Yes, that is a Thomson turbine.

5661. Are you familiar with the Lefell turbine?—I am not; I know its construction though.

5662. The Lefell is the adoption of Thomson's inward flow, is it not?—Yes, but I believe it is what is called a mixed-flow turbine.

5663. Are you certain?—Yes.

5664. That it is not inward flow, but mixed?—It is inward-flow, and mixed-flow. When I say mixed-flow, I mean to say that the water enters from the outside radially inwards, and leaves more or less parallel with the axis.

5665. I want to ask you a question about the M'Adam turbine. I will put the structural difference between the M'Adam turbine and the

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Mr. BODMER.

[Continued.]

Mr. Macartney—continued.

the Leffell turbine to you. Are you aware that in the McAdam turbine there are hundreds of ports as compared with the Leffell; do you understand what I mean?—Yes.

5666. That, as compared with the Leffell, there are probably a hundred ports, and that in the Leffell there are comparatively few?—It is the tendency with the American turbines to have fewer ports.

5667. In this model there are 36; I have counted them?—Yes.

5668. If that was constructed on the Leffell principle there would only be 12 there, would there not, so that the aperture, instead of being the size of one of those would be the size of three of them, would it not?—That is quite possible.

5669. Would that, in your opinion, afford obstructions passing through a turbine, whether fish, wood, or turnip, a better chance of getting through?—Yes, a slightly better chance, decidedly.

5670. Taking the sketch which you showed the Committee drawn to scale, in your opinion, would a piece of wood of the size which has been produced before you, show marks of injury if passed through such a turbine?—Yes. I should say decidedly. Of course, as I said before, it is possible that a few pieces might get through.

5671. But supposing you pass 12 pieces through, do you think any of them would show injury or not?—I should say decidedly they would.

5672. And supposing 12 bits of turnip, of precisely the same size, were passed through, would you expect to see them come through whole?—No, I should not.

5673. Would you expect to see them bearing serious marks?—I should.

5674. You expressed an opinion, which is merely an opinion; that is to say, you have no knowledge, and you never had an opportunity of observing yourself, whether fry are cut through a turbine, have you?—No, I have not.

5675. And you have had no opportunity of forming any conclusion from examining the water below a turbine and above it?—No, not as regards fry.

5676. So that your evidence is merely an opinion upon that point, is it not?—Yes, so far. Do you mean as regards the tendency of the fish to go down?

5677. Yes?—Yes, quite so.

5678. Do you agree with the evidence that fry going down a river go down head foremost?—I have always seen fish go head foremost. A fish does not swim tail foremost, as far as I know. I have seen a great many swimming and never seen them going tail foremost.

5679. The evidence before the Committee, I think, is that they do so. They drop down stream tail foremost. They appear to be swimming against the stream, but they are dropping down?—Do you mean they are only partially successful in struggling against the stream?

5680. No, that they drop down. Your idea

Mr. Macartney—continued.

is that they go through the turbine head foremost, is it not?—I do not think it matters.

5681. Is it not material in your view?—I should say it is not at all material. In fact, I should think it is rather to their disadvantage to go through tail foremost, because they could not see what is coming. I mean they would not have the ghost of a chance of avoiding anything which they saw in their way.

5682. Would there be any vibration in the water immediately in front of a turbine wheel?—Do you mean immediately in front of the inlet pipe?

5683. Yes?—There would not be exactly vibration, but there would be a fairly strong current.

5684. But there would be no vibration you think?—No, nothing to speak of; there would be a ripple perhaps.

5685. We have expert evidence that there is perceptible vibration communicated to the water by the action of the machinery?—Do you mean vibration from the motor?

5686. Yes?—That might be the case certainly, especially if the way in which the motor was fixed was not very rigid, and the foundations not firm.

5687. Could a motor perform heavy work without being fixed rigidly?—It would have to be fixed fairly rigidly.

5688. I mean to say, taking a turbine developing 80-horse power, and used for driving a lot of machinery, where it is necessary to have an absolutely smooth drive, would not the turbine, in that case, have to be fixed as rigidly as possible?—Certainly it would; still, of course, a very slight movement constitutes a vibration, as you know. You may get a vibration of very heavy bars, but the actual movement is very small.

5689. I only want to know if a turbine driving heavy machinery every day would not be likely to communicate some amount of vibration to the water, in your opinion?—Yes, it might.

5690. You said just now, talking of the power developed by turbines, that they gave a greatly increased power to the millowner?—Yes.

5691. What is your opinion of the increased power developed by a turbine as compared with a breast-wheel or an ordinary wheel?—I should say, as compared with the breast-wheel, at least 25 to 30 per cent., and taking an undershot water-wheel it might be as much as 50 per cent.

5692. Do you say, in your experience, that that is invariably the case, and that there is no description of water-wheel which would develop as much as a turbine?—I think that in some exceptional cases an overshot water-wheel with a very high fall is as efficient almost as a turbine.

5693. Do you know anything of Fairbairn's overshot wheel?—Yes.

5694. That would develop as much as a turbine, would it not?—It might with a very high fall.

5695. So that practically the turbine does not occupy as isolated position as a hydraulic motor. For instance, there is Fairbairn's overshot-wheel which

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Mr. Macartney—continued.

which might develop as much power, might it not?—Yes, it might in certain cases.

5696. You are not prepared to say it would not, are you?—Cases have been known where overshot-wheels have given 80 per cent., but they are isolated cases, and it is a regular thing for turbines to give it.

5697. Have you any local knowledge of mills in Ireland?—No.

5698. And you have no knowledge of the class of turbines there except what you find in the evidence given here?—No.

5699. Are you strongly of opinion that it is impossible for fry to get through these turbines?—Yes.

5700. It is a mathematical certainty, you say, that they would be killed?—I should say so, in the majority of instances.

5701. Are you aware that in addition to the evidence of millowners, there has been the evidence of two experts, one of whom was Mr. Cudde, who has had a large experience in Ireland, who do not hold the same opinion?—No.

5702. I suppose you have heard the celebrated statement made by Lord Grimthorpe, that there was hardly any single statement made by one engineer which another could not be brought to contradict?—Yes, I have heard that, and perhaps there is a little exaggeration in that statement.

Mr. Pinkerton.

5703. I understood you to say that with a stream of water flowing at the rate of 12 miles an hour, fish brought into contact with any object would be killed by the impact?—I should say so; but I am here as an engineer.

5704. As an engineer you gave that opinion?—I should be of that opinion.

5705. Are you aware that the mountain streams in Scotland flow with double that rapidity?—Yes, I can imagine that; but I was not dealing with exceptional cases.

5706. You have not visited any of these mills, have you?—No, I have not.

5707. Is what you say merely theory?—Do you mean as regards especially the Irish mills?

5708. No; as regards the experiments of passing fry through a turbine?—Yes; as regards passing fry through a turbine.

5709. You never saw an experiment carried out, did you?—No, I have not.

5710. Have you any idea whether that piece of wood represents the size of the smoults on the tributaries of the Bann?—Yes, I have a very good idea, because I have seen smoults in other rivers, and I take it they are very much the same everywhere.

5711. But evidence has been given directly contradictory to that before this Committee, and that smoults differ in size?—We; not it accepted that smoults were from four and a-half to five inches long.

5712. We have evidence to show from men who have been examined on behalf of the fishery owners, that there presents the size of smoults in Irish rivers?—Even if it did, as I said before, I should expect pieces of wood, or smoults of that size, or a large proportion of them, to be nipped or hit by the turbine.

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Mr. Pinkerton—continued.

5713. Do you say if that piece of wood was an inch and a-half longer it would be a mathematical certainty that it would be crushed through the turbine?—That would depend on the pitch of the vanes, but in any case it is a mathematical certainty that a large proportion of them must be nipped or hit.

5714. Are you aware that the gentleman who produced those pieces of wood and the pieces of turnip passed a good number through the turbine, and brought all the pieces here, and submitted them to the examination of the Committee?—I was not aware that he brought them all here.

5715. According to his evidence it was so. He told us the number he passed through, and he produced them all here?—Of course I am not in a position to contradict that, not having seen the experiment. I presume that was done when the turbine was running at its full speed.

Mr. Seaton-Kerr.

5716. I think you stated, in answer to Mr. Macartney, that there were very few places in England where turbines could be used?—I will not say very few, but I mean relatively to the enormous quantity of power used in England, the opportunities of applying turbines with advantage are comparatively few.

5717. As compared with Ireland?—There is more water power in Ireland and Scotland.

5718. I think you stated you are not familiar with Ireland?—No; of course I know there is a great deal of water there.

5719. I suppose in your professional experience you know pretty well the class of water power that is to be found in Ireland?—Yes.

5720. You know it from information and hearsay?—Yes.

5721. And you say as compared with the water-power in Ireland, the water-power in England is not so suitable for turbines, do you?—No, it is not so suitable.

5722. In the future, for instance, they are far more likely to be developed as a hydraulic motor in Ireland than they are in England, are they not?—Yes, I should say so. Of course I do not include Wales in England, because there are great opportunities in Wales of using water; I said England, not the United Kingdom.

5723. A law affecting the rights of millowners to put down turbines in England would hardly apply in that case to Ireland under these circumstances, would it?—In what way?

5724. In England the places would be so few and far between where the turbines would be put down?—Yes, generally speaking, they would.

5725. Is it because there is not such a fall for the water in England?—Yes, that is the chief reason. Where there is water the rivers are generally sluggish, and the fall is small.

5726. And in those rivers the turbine is not likely to be used, you think?—Not to the same extent. Turbines can be used down to a head of three feet, but that is an exceptionally low head.

5727. With regard to the protection of turbines, will you look at this model of a grating. Do you think that a grating of that kind erected

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Mr. Seton-Karr—continued.

in a mill-race would interfere in any way with the working of the turbine?—No, not if the aggregate area between the bars is sufficiently great; certainly not.

5728. Do you see any reason why the working of the turbine should be in the least affected by any erection of that kind?—No, certainly not.

Mr. Pinkerton.

5729. In that case you would be bound to widen the intake, would you not?—That would all depend on circumstances. All you have to do is to get enough water through.

5730. All you have to do is to get enough open space, to simplify it?—Yes.

5731. And in case you had a limited space you would require by some means to widen the intake, would you not?—Yes, or else there would be a slight tendency, as a previous witness pointed out, for the water to rise until the head was sufficient to force it through. The margin is usually pretty large.

Mr. Seton-Karr.

5732. Will you look at this very rough diagram (*handing the same to Witness*). This is supposed to represent the mill-race in section, and this is supposed to represent the intake; the supply to the turbine, and this is the height of the water; that would be the head, I take it, to the motor, would it not?—Or rather to the tail water level, strictly speaking, just as it leaves the turbine.

5733. Imagine a grating of the kind that you have seen in the room erected here; in your opinion, I take it from what you say that that would not interfere with the working of the turbine here?—No, provided sufficient water got through it.

5734. What conditions would have to be furnished. May I take it that the main condition is that the water should be kept at that level?—Yes.

5735. Nothing else?—Nothing else.

5736. If the action of the grating was to reduce that say an inch or two, or three inches, would it materially interfere with the working of the turbine?—No, it would not. You would simply lose that percentage of head. For instance, if you had a head of 108 inches, and you lost two inches, you would lose about two per cent of your head.

5737. For practical purposes, would that make any difference?—No, it would not; and, as a matter of fact, the tendency would be for the water to rise a little there, and the thing would rectify itself to some extent.

Mr. Macartney.

5738. How do you mean?—I mean to say, in proportion to any obstruction, the water would rise slightly, and would flow through the grating with a slightly greater velocity than it did before.

Mr. Seton-Karr.

5739. The pressure of the water coming through those openings would be greater; it would come through quicker, would it?—Yes; but, as a matter of fact, in the ordinary cases

Mr. Seton-Karr—continued.

the action would be so slight as to be practically unimportant altogether.

5740. I will find it in this way: with a variation of 2 or 3 inches in any ordinary head of water, would it materially interfere with the working of any turbine?—No, it would not.

Mr. Macartney.

5741. Supposing a grating was put in of that description which varied the head of water by 2 or 3 inches, would not the water on the other side of the head be backed up?—Yes, it would be slightly backed up.

5742. Therefore, if previous to the grating being put in the water was absolutely at a level with the sluice to the byewash, the water would go over the sluice to the byewash, would it not?—It would, if there was a very small margin.

5743. I am taking the case now of a head of water for which the whole river is wanted, and that head must be kept up to a certain level; and you put in your grating; that might, at all events, diminish the head of water by 2 or 3 inches, might it not?—Yes, it might.

5744. Then the water headed back, would, of course, rise behind?—Yes.

5745. And at the level of the sluice the natural effect would be that it would flow over that sluice, would it not?—Yes; but the water would only flow over the byewash in times of flood, and the height of the overflow to the byewash would be so regulated that the water would not flow over except in times of flood when there would be an excess of water.

5746. I am taking a case where the head of water is absolutely on a level with the sluice, and where, in order to get a sufficient head of water to work the turbine, the level of the water is on a level with the sluice, and where the water being headed back it would only flow over into the byewash?—But that would not be the case because they generally allow a margin for floods with the byewash, so that when there is an excess of water it may have another way of escape.

5747. That is your view; do you mean to tell the Committee that the reduction by an inch or two in the head of water would not affect the working of a turbine?—Not materially.

5748. What do you mean by materially?—It depends on the height of the head, of course. If you had 100 inches of head and you lost one inch, there would be a loss of 1 per cent.

5749. Supposing you require every eighth of an inch of your head to work your machinery, do you not think it might have some material effect?—It would have this effect; in 100 inches one inch would represent a loss of 1 per cent; you would get 1 per cent. less power.

5750. And if it were lowered 2 inches it would be 2 per cent.?—Yes.

5751. And from your point of view, as a civil engineer, would that be absolutely immaterial in carrying on the work?—It is desirable to get all the power you can, of course.

5752. Would that alter the steadiness of the drive do you think?—No, it would not materially interfere with the drive.

5753. Would

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[Continued.]

Mr. Seton-Karr.

5753. Would there be a sluice in here between the imaginary grating and the intake of the water for the turbine?—There would be as a rule.

5754. Can you describe to me exactly the object of that sluice, and how it is made?—The object of the sluice is to be able to shut off the water from the turbine entirely when it is not wanted at all. In case you are making repairs, or you want to get at the turbine to clean it, then you shut down the sluice and the water goes over the byewash.

5755. Is not that sluice sometimes partly open when the turbine is working?—Yes, in cases.

5756. Because sometimes they have more water than they want, for instance?—Yes, in times of flood, for instance.

5756*. So that they regulate the water, in fact, by that sluice, do they?—They regulate by the sluice, and they also regulate by the regulating apparatus on the turbine, but that depends on circumstances a good deal.

5757. What I am asking is this: Supposing this grating is put here as a fry guard, if it had the effect of reducing the head of water, that could be counteracted by the sluice, could it not; in other words, the sluice, which before was only partly open, could be opened wider, could it not?—Certainly, if with the partly-open sluice you have all the area that is necessary; a velocity of about three feet per second in the canal taking the water to the turbine is generally allowed for.

5758. Then you mean the sluice might be opened wider, to allow the same velocity, after the grating was put up, do you?—Yes.

5759. Again we have had an imaginary case that the effect of that grating there has reduced the level two or three inches?—Yes.

5760. You do not mean to tell us that that would be the effect of the grating, do you?—Not necessarily.

5761. You only assume that?—Yes; at the very worst.

5762. But, assuming that, in that case, I suppose, if the mill race was widened a little, and a little more surface given to the grating, that result would be counteracted, would it not?—Yes, quite so.

5763. It would not be a difficult matter to counteract anything of that kind, would it?—No, not in the least. For instance, supposing things were drawn so fine that your head race was not quite big enough, it would be sufficient to widen the head race at the very end in front of the grating, so as to give additional area.

Mr. Tomlinson.

5764. That is before you come to the grating?—Yes, before the water gets to it.

Mr. Seton-Karr.

5765. So that, assuming the action of the grating is such as you have described, then, either by widening the grating area or by, possibly, working in a different way with a sluice, any diminution in the height of the heading could be counteracted, could it not?—Certainly.

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Mr. Tomlinson.

5766. In making calculations in putting up a turbine, which would be part of your business, you would take into consideration the velocity of the stream and the head of water, and everything of that kind, I suppose?—Yes; the velocity of the stream, as a matter of fact, before it reaches the turbine is not taken into account in estimating the power. You generally make the velocity rather low, as I said before, about three feet per second, just sufficient to take the water to the turbine, because the power represented by the velocity of flow of the head race is generally, for practical purposes, lost.

5767. Do you make any calculations for friction of water?—Yes, I should do so.

5768. If a grating was put up with the bars rather close, apart from the tendency to accumulate rubbish in front of it, there would be some loss of power from friction, would there not?—Yes, there would; when I say you would have to allow a larger area, you would have to take contraction and friction into account.

5769. What proportionate element would the friction come to?—That would depend on the shape of the bars; with bars well rounded on the front head; that is to say, the surface against which the water flows, it would not amount to very much.

5770. Should you think the grating you have looked at would be likely to cause a good deal of friction?—No, the rounded edge of that I take it is the edge with which the water comes into contact first. As far as the shape of the bar is concerned, I should think that would be a very good form of grating.

5771. Would you consider there should be material deduction for friction in putting a grating of that kind into the head-race?—No, not very material.

5772. Can you say approximately what deduction you would make?—If I wanted to go safely I should probably allow about 10 per cent., but that would be a very ample margin; it would not amount to that, and probably would be five or six really; but in these matters one always calculates so as to allow a certain margin, to be perfectly safe.

Mr. McCortery.

5773. At what part of the mill-race would you propose to put that grating?—It is generally put in the head-race.

5774. What part of the head-race?—Pretty close to the turbine.

5775. According to the evidence we have had before us, most of the head-races are very long ones, about 400 yards. Do you say the length of a head-race would make no difference as to where you should place that grating?—As far as I can see, no.

5776. You would put it near the turbine whether the head-race was a long or short one?—Yes, I should certainly.

5777. You have told the Committee that there is a certain percentage of loss from friction and one or two other causes?—Yes.

5778. There are occasions when fry go down the mill-race, and having gone down a mill-race

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Mr. Macartney—continued.

of 400 yards they arrive at this grating through which they cannot get?—Yes.

5778. We have also the evidence of the fishery owners and the Conservancy Board that nothing will induce a salmon fry to go back into the river, and that they never return. Now take the case of a mill running night and day, that is where the sluices are not open from Monday to Saturday; the salmon fry having come down in shoals would meet this grating and would be jammed up against it, because they would never go back. Then these shoals of salmon being there, would they not materially conduce to block the water? If thousands of salmon fry 4½ inches long come across your grating do you not imagine there would be a considerable diminution in the volume of water?—If they were packed like herrings in a barrel certainly, or if their tails got jammed in the gratings, of course it would be so; but if they are distributed, as fish usually are in water, it would not.

5780. The evidence is that they are not distributed, but that they come down in shoals with a leader tail foremost, and wherever that leader goes they go. I put it to you, assuming that what the fishery owners and the Conservancy Board say is true, and that they come down in shoals and nothing will induce them to go back into the river out of the head race, and that for six days, night and day, they would be blocked up against that grating, that that would have a very material effect it, say, 2,000 of them were congregated there, in choking the grating?—Yes, if they were close enough; it would depend a good deal on circumstances. I take it that these fish would not necessarily absolutely get jammed up against the grating. They would probably keep themselves just floating against the stream when they found they could not get down.

5781. But you have no knowledge of fish, have you?—I will not say I have no knowledge of fish; I have caught a good many and I have seen them.

5782. I am assuming the case of the fishery owners, and that they come down and get stopped by these gratings, otherwise they would get into the turbines. If they did come against these gratings to the extent of thousands it would have a material effect in obstructing the grating, would it not?—If thousands of them came actually against the grating and stuck there, it would.

Mr. R. L. MOORE, re-called; and further Examined.

Mr. Seton-Karr.

5791. You have heard the questions which have been asked the last witness about the smolts going down the rivers. Will you tell the Committee whether, in your opinion, smolts go head first or tail first down the pipe of a turbine?—They would go any way I should think. I could not tell you how they would go down the pipe of a turbine absolutely; but they go down the river tail first.

5792. From your knowledge of the habits of smolts, do you think they would go down the

Mr. Pinkerton.

5783. Suppose, in order to avoid that obstruction, that grating was placed at the intake, and the consequence was that the water was dammed back, it would throw the water over the weir, and the millowner would lose the benefit of the surplus water entirely, would he not?—I do not quite follow your question. Do you mean, if the gratings were placed at the intake?

5784. Yes; I am not asking questions for the purpose of embarrassing you. I agree with you that if you increase the superficial space of the intake the gratings may be no obstruction. But supposing that the owner of the land on each side of the mill race refused to allow the intake to be widened, what would the consequence be of a grating being placed at the intake; would it not tend to obstruct the flow of water into the mill-race?—Not more than it would if placed at any other part.

5785. But at any other part the back water is in the mill-race and is not lost; in the other case you would drive it over the weir, would you not?—Yes, partly, if quite close to the intake.

5786. I am on the question of the difficulty of widening the intake. I agree that your evidence is all right, that if you widen the intake you remove the difficulty with regard to the grating; but where the millowner cannot get the consent of an adjoining owner to take land to widen, what will the millowner do?—He will have to do the best he can.

Mr. Seton-Karr.

5787. As a matter of fact, the water in the mill-race where the grating would be erected, would be flowing quite slowly in ordinary cases, would it not?—Yes.

5788. And, as a matter of fact, there is no possible chance of large quantities of fry being jammed against the grating like Mr. Macartney suggests, is there?—That is why I said if the fry got jammed against the grating they would obstruct it.

Mr. Tomlinson.

5789. But this is only a matter of opinion on your part, is it not?—That is all.

Mr. Seton-Karr.

5790. Is it only a matter of opinion; you have no special knowledge of the habits of fish, have you?—No.

Mr. Seton-Karr—continued.

supply pipe of a turbine head or tail first?—I do not know how they would be dragged down it; there is such a suction of water down the pipe of a turbine that they might go head or tail first, or sideways.

5793. Can you form an opinion about that?—Not when they get to the pipe.

5794. Do you think they would go down anyhow?—Yes, certainly. When they come down the river they drop down tail foremost.

5795. Supposing by any chance a salmon fry

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Mr. MOORE.

[Continued.]

Mr. Seton-Karr—continued.

or smolt, or a salmon does go head foremost down a stream, it is necessary for him to go faster than the stream, is it not?—Certainly, or the gills would open.

5796. The effect is, if he does not go faster than the stream, that he is drowned, is it not?—Yes, the gills open. Both salmon and fry go tail foremost down a stream, or they go sideways. If they go head foremost down a stream they will go faster than the water; they will swim at a tremendous pace, otherwise the gills open, and they get drowned.

5797. The ordinary expression is that they get drowned?—Yes.

5798. Let us imagine a smolt going into the supply pipe of a turbine. If he does go down head foremost he must go faster than the water or else he will get drowned, will he not?—Certainly.

5799. Therefore, in order to drop down he must go down tail first?—To drop down the pipe do you mean?

5800. Yes; with comparative safety to himself he would have to drop down tail first, would he not?—With safety to himself until he arrived at the turbine, do you mean?

5801. Yes?—I suppose so. The rush of the water is such at a turbine that I do not think the fry could command itself at all.

5802. Then you think he might be washed down the pipe either head first or tail first?—I think he might be washed down the pipe in any way.

Mr. Macartney.

5803. How many seconds does it require to drown a salmon fry?—I do not know.

5804. Have you no knowledge whatever?—No.

5805. Or how many minutes?—No.

5806. Has anybody?—I do not know; I have never heard.

Mr. Pinkerton.

5807. How long would it take the fry to go through the turbine?—That I have no conception of either.

5808. You know the rate of the flow of the water, and that it would only be a second passing through, do you not?—I have no conception as to that.

Mr. Macartney.

5809. All we know is that if salmon or salmon fry continuously go down without swimming faster than the stream, they eventually get drowned?—Yes, so everybody believes.

5810. But there is no possibility of ascertaining what length of time it requires to drown them, is there?—No, I have never heard of it.

Mr. Seton-Karr.

5811. Is it not the practice when you hook a salmon to endeavour to get the fish to go head downwards down the stream?—Yes, it is always done in order to drown them.

5812. And if you can succeed in leading your fish head foremost down the stream he is exhausted almost immediately, is he not?—It is the case.

5813. In a few minutes?—I do not know the period; but it is the case, and every angler knows that.

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Mr. Teeslinson.

5814. When fish are going down tail first, they are not going faster than the stream, are they?—No, they go very gently.

5815. Do they float down with the stream?—Yes, and they sometimes move a little bit forward, and drop back again.

5816. Can you imagine a fish getting to the pipe of a turbine being able to turn round if it were tail first there. Is it not a matter of uncertainty, as long as it existed, whether it would go tail first through the turbine or not?—I should think that, if he got to the pipe of a turbine, he could not stem the water at all.

Mr. Seton-Karr.

5817. He would absolutely have no control over his motions in a turbine pipe, you think?—I should think not.

5818. One question with regard to a fry in front of a grating. I suppose there is no chance, as a matter of fact, of smolts or fry being washed or jammed up against a grating in an ordinary mill-race, is there?—Not at all.

5819. The rush of water is not strong enough, is it?—The rush of water, I believe, is not strong enough before it enters the pipe, and fry move backwards and forwards, and never congregate in the way described by Mr. Macartney.

Mr. Macartney.

5820. I was only quoting the evidence that they go down in shoals?—They do, but they would not accumulate in the way you speak of.

5821. How do you know?—Because they move backwards and forwards.

5822. But you have never seen any grating of this sort up, have you?—They would not become jammed there.

Mr. Pinkerton.

5823. In the case of a mill working night and day where there is no byewash, what would happen?—The fry would move backwards and forwards.

5824. If they do not go up the stream again, what becomes of the fry?—If there is no byewash, and if they are impounded there by a grating that they could not get through, and there is no overflow, I think they would ultimately die.

5825. Then are you of opinion that gratings should be placed at the intake?—Yes, I think it would be a great deal better that they should be placed at the intake as far as the fish are concerned, but fry, I should add, do not run except in floods; they will not run in dry weather. There are no fry in the Bann River this year. I had a letter from Major Leslie as to that. There is certainly no run of fry in the Bann now, Mr. Dinmore is working by steam at the present moment, and is not able to work by water.

Mr. Teeslinson.

5826. Then the inference from that is not that there is no fry in the river, but that the water is too low for them to come down, is it not?—I dare say there is fry, but they never commence to run in these large shoals except in times of flood.

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5827. The

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Mr. MOORE.

[Continued.]

Mr. Seton-Karr.

5827. The fry go into the mill-race because that is where the greater flow of the water is, under ordinary circumstances, I suppose?—I should think that in the Maine River there is no water anywhere else, except in the mill-races.

5828. It is not from natural perversity they go into the mill-races, but they go there because those are the only places where there is any water at the time of the year they are descending the river?—Yes.

Mr. Macartney.

5829. Supposing fry did not go into the mill-races, and supposing they went over one of the weirs, there being no fish passes, what do you say?—Fish passes have nothing to do with the fry unless there is water in them.

5830. But if there is water in fish passes they might possibly go down them, might they not?—Certainly they might.

5831. It does not matter whether they do or not for the purposes of my question. But supposing there was water enough in the river to take them over, or supposing there was an excessive flood, which sometimes does occur, even in the Maine, which not only gives effective water power to the mills, but also goes right over the weirs, what happens to the fry then. I suppose he has a sudden fall, has he not?—Yes.

Mr. JAMES O'TOOLE, called in; and Examined.

Mr. Seton-Karr.

5840. I BELIEVE you are the resident engineer in charge of the Cork Waterworks?—Yes.

5841. How many years have you been there?—Since 1878.

5842. I believe the Cork Waterworks are worked by turbines, are they not?—Partly; we work by steam and water power. We have four turbines.

5843. What kind of turbines are they?—We have two of "Fournayron's" and two "New Americans." We run about 240 horse power with the four turbines. The two Fournayron's were made by M'Adam, of Belfast, but he is not the designer of them. A man from Armagh, I think his name was W. Callen, went to France, and studied the construction and proportion of the turbine. And after his return to Ireland, designed this pattern turbine, and M'Adam's, of Belfast, undertook the manufacture of them.

5844. Are they reactionary or impulse turbines?—They take the water on the inside and throw it off on the outside.

5845. With a radial outward flow?—Yes.

5846. And the buckets or compartments are not always quite full of water, are they, but only partly full when the turbine is in work?—They must be full of water, if not the turbine is not doing good work.

5847. But I thought you said they are impulse turbines?—Yes, they take the water on the inside, and the outside portion of the turbine revolves, producing the power.

5848. What is the diameter of these two larger ones?—Ten feet six inches.

Mr. Macartney—continued.

5832. And there is an extreme velocity of water?—It is not very extreme.

5833. Do you mean to say if the water falls over nine feet of weir it has not great velocity?

—Weirs are generally sloping.

5834. Is not the velocity of the water increased?—Yes, of course it is.

5835. Do you think there is a very material difference in a heavy flood of water going over one of the weirs on the Maine and going into a turbine?—I should think on a sloping surface the water does not run so quickly as with a direct fall.

5836. And a fry going over one of the weirs on the Maine would be quite able to balance himself and keep his head, would he?—I do not think it matters whether he keeps his head foremost down the stream for the time he is going over.

5837. It would be absolutely immaterial, you think?—Yes.

Chairman.

5838. And I take it that a fall over the weir is a fall into the natural river, which would be the natural course for a fish to take?—Certainly.

5839. But a fall down the tube of a turbine into a machine, which is whirling round, has a very different effect, has it not?—Yes.

Mr. Seton-Karr—continued.

5849. Is it a fact that they are the largest turbines in Ireland?—Yes, the largest I know of.

5850. What are these two turbines here?—They are the two "New Americans."

5851. Are they on the same principle?—No, the reverse; they have an inward flow.

5852. Are they impulse or reactionary turbines?—I do not think that either term properly applies to a turbine.

5853. Do you know what is meant by an impulse or reactionary turbine?—No; I know that turbines are of two descriptions, one taking the water on the inside, and distributing it on the outside, and the other taking it on the outside, and distributing it on the inside. Poncelet, a Frenchman, I think, was the first to make the last mentioned form of turbine.

5854. Are these new turbines?—They are of the newest; they have been up only two years and a few months. The others were erected in 1858; they are some of M'Adam's first turbines.

5855. I believe you have fry guards or smolt guards in front of them, have you not?—Yes, we have guards 76 feet in breadth.

5856. Is that the breadth of the millrace at the point where the guards are erected?—Yes, the fry guards are 76 feet long.

5857. That is where your fry guard is situated?—Yes.

5858. Where are the turbines with regard to these fry guards?—Here they are (pointing on the drawing), and the turbines are about 50 feet behind them; this is the river, and our weir is 400 feet long.

5859. What length is your millrace from the intake

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Mr. O'TOOLE.

[Continued.]

Mr. Seton-Karr—continued.

intake from the river down to these guards?—Somewhere about 26 feet.

5880. I mean from the intake?—We have the whole River Lee on us, that is 28 miles.

5881. What is the length of your headrace?—About 80 feet.

5882. Then it is a very short head race, is it?—Yes.

Mr. Macartney.

5883. Is that the length or the width?—The width. This is the river proper, with a weir across it, 400 feet long, and all the water that comes down the River Lee is free to flow over it, and we take in what is required to work the turbines.

Mr. Seton-Karr.

5884. Then the length of your headrace is only about 80 feet, is it?—Yes.

5885. Will you describe the kind of fry guards which are erected here?—Yes, I have one here (producing some). This is just half the length and half the width of the guard in.

5886. Is that the exact size of the spaces between the bars?—Yes.

5887. Does that represent the exact distance between the transverse bars?—Yes, everything, except in the length and width.

5888. Each piece is twice as broad and twice as long, I understand?—Yes.

5889. How long have you had these gratings in?—This is the first year.

5890. Were they put in for the purpose of protecting the smolts from the turbines?—Yes. We had a lattice something like that one in the room, and it gave us so much trouble to keep it clean that I introduced this.

5891. Do you find that grating interferes at all with the working of your turbines?—No, I tested it on two occasions, and the loss of head was nil.

5892. How did you test it?—Practically, and when the turbines were at full work. I tested the level of the water in the head race with a gauge, forward of the fry guards and behind them, and the water forward of the guards, and behind them gave the same level; there was no loss of head.

5893. That means there was absolutely no loss of head of water?—None.

5894. What time of year was it you made that test?—About a fortnight ago.

5895. The river was not in flood or anything of that kind, was it?—No.

5896. Was it low?—No, it was about level with the weir. We had, I think, this turbine stopped; we had these three working. We do not have enough water at this time of year to work all our turbines. We have to go to the steam-power. At present we are very low and are compelled to shut these two off.

5897. That is owing to the looseness of the river, is it?—Yes.

5898. Does the grating affect your supply?—No.

5899. How long did you have that fry guard up?—The old fry guards were in use before I took charge of the works. They were a little better than that (pointing to lattice in the room) lattice; that is a very bad description of fry guard to let water through.

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Mr. Seton-Karr—continued.

5890. What kind were they which you had first?—They were formed of bare three-sixteenths of an inch diameter, and spaced same as the new fry guard, with bars across and knotted.

5891. Do you remember how long they had been there?—I believe they had been there since the erection of the turbines, or as soon after as they found the fry were cut up by the turbines.

5892. Was that more than 13 years ago?—Yes; when the turbines were started first of all, the fry that passed through were cut into small pieces and found in the tail-race the same as if chopped up on a butcher's block.

5893. Was that when they were first erected?—Yes, when Mr. Adam's turbines were put up.

5894. In 1879?—No, in 1858. Then the gratings were put up by the corporation, of course, to protect the salmon fry.

5895. You originally had the old kind of grating, I understand?—Yes.

5896. How long were the old kind of fry guards in before you adopted this new one?—They must have been in from the year 1859 till I went there.

5897. And the waterworks were working all the time?—Yes, they never stopped.

5898. Is this correct. They found that this new kind of guard was a better guard to keep clean than the old one, so they placed them there?—Yes, one man considers himself very well off, and lightly worked if he has to keep 76 feet of the fry guard clean with a brush.

5899. He thinks he has easy work, does he?—Yes; he says he would sooner keep three of them clean than one of the old ones.

5900. Is it a fact that those turbines since 1858 have been protected up to the present time?—Yes.

5901. And you put these new kind of guard in about a year ago?—This is the first year.

5902. Can you give us the date when you put them in; have they been in a year?—No; I put them in in April. We only require them for two months of the year.

5903. You only have them in for two months of the year?—Sometimes not so long.

5904. What two months?—April and May; sometimes we put them in in March and they remain through April, and we take them out the 1st or 2nd of May after the smolts have passed the weir; the smolts come down the river once every year between the month of March and the month of May.

5905. Are the fry guards made in double sets?—We only use them singly, but we keep four or five spare ones in case of an accident.

5906. But when you clean them do you not replace the dirty one by a clean one?—No, we never take them up at all except when an accident occurs.

5907. Was it the old kind of fry guard that you had to have a duplicate set for?—No, we have them of each sort, the old and new. Some accident might occur; the brush might get jammed. A piece of stick might get through or anything of that kind, but as a rule, we never have to replace them, but in case anything might

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occur

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[Continued.]

Mr. Selous-Kerr—continued.

occur we always have one to drop in front. We have two lines in the bridges prepared for them; and we can drop the guard down in a minute.

5898. I am asking you about the process of cleaning?—We clean them with a brush.

5899. Do you not take them up to clean them?—No.

5900. Are they cleaned with great ease as they are in their places?—Yes.

5901. I suppose no fry can possibly get through those guards?—None has got through.

5902. What is the width of the bars?—Five-sixteenths of an inch; that is the regular mesh put down for salmon fry.

5903. Have you any other guards in the mill race besides those?—Yes, we have a fixed guard there.

5904. That is to keep larger substances out, is it?—Yes; these are embedded in cast-iron grates put into the head of the head race and concreted, and the bars slip in. They are a fixture; they have been there from the time we started.

5905. What is the space between them?—Two-and-a-half inches.

5906. Is that large enough to prevent slats going down the race?—No, it is not.

5907. Do you mean to say they can go through 2½ inches?—Yes. We have enormous floods on the Lee, and this grating takes the dirt. Slats will pass through and meet this other grating, which is also fixed. That is an inch and five-eighths, and no slat passes that.

5908. Do they go back?—Yes, they go back in their own natural time when once the water flows over the weir.

5909. This and that grating are, I understand, permanent?—Yes, and one of them, the forward one, is 82 feet long. The other is 74 feet.

5910. And the fry-guard between is 78 feet, is it not?—Yes.

5911. Then the fry-guard grating is the only one you get in for the purpose of protecting the fry, is it?—That is so.

5912. Can you give the Committee some idea of what that fry-guard costs?—Seven shillings a square foot is the cost.

5913. What is the total cost?—If you multiply 78 by 8 by 7, you will get it.

5914. Are they only eight feet deep?—That is all.

5915. That gives us a cost of about 210 £, does it not?—Yes. They could be made cheaper than that, if made in large lots.

5916. Yours is a specially large mill-race, is it not?—Yes, very large.

5917. Does that cost include everything?—Yes. We have only put 12 new ones in at present, but we have the others in hand.

Mr. Tomlinson.

5918. For the rest have you those lattice guards at present?—Yes, but as the turbines are not all working, we do not much mind. We did not finish the new ones this year, as the men had not time to produce them by the time the fry came down.

Mr. Selous-Kerr.

5919. You talked just now about the injury which was originally done to the fry before these turbines were protected. Can you give the Committee any particulars as to that?—I could not speak to it personally, because I have not seen it, but from what I have been told by the workmen, the reason why the fry were put in was in consequence of the enormous quantity of fry killed by the turbines. They were that thick that they could be taken up with shovels in the tail-race.

5920. Who told you that?—The men who took them up.

5921. The men who had actually done it told you they had taken them up in shovel fulls, did they?—Yes, the sand-men who are working in the tail race. I have taken myself old salmon out of the turbines.

5922. Killed in the turbines?—Yes; I have taken them up in buckets full and burnt them in the boilers.

5923. Lately?—No, before I put this fixed grating up. When I went to the works they had a vertical grating up on a wood sill, but it became damaged and the bars used to shake backwards and forwards and the slats used to go in, and you would find them in the turbine in such quantities sometimes that the turbine would almost stop working.

5924. They could not get through alive, could they?—You would find them the shape of the guide curve of the turbine, half-arched, and the marks of the grating printed on the salmon's backs.

Mr. Macartney.

5925. Were they spent salmon?—Yes; no other salmon could get in, because the salmon coming from the salt water would not go this way; they would rush up.

Mr. Tomlinson.

5926. What size would these slats you are speaking of run to?—Some of them 10 lbs. and 30 lbs.

Mr. Macartney.

5927. What was the size of the aperture between the bars?—I am explaining that the old fixed grating that was there was placed on a wooden sill, and the bars got all loose and used to spread, but since I have put the new grating in we have got no slats in the turbine. Before that I have taken them out in buckets full.

5928. You are not now speaking of this grating, are you?—No, I am speaking of the fixed bars that are always in the head-race.

Mr. Selous-Kerr.

5929. Speaking as an engineer, do you think it is possible that fry could go through any kind of turbine without injury?—No, I do not see how he could through McAdam's turbine; they would be certain to be cut into small pieces.

5930. Is there any other more modern kind of turbine through which he could go with greater safety?—I should say not, for this reason: all turbines may be looked upon as vertical shears. There is the part of the turbine which does not rotate, and the wheels which revolve, these two parts are beautifully machined in the hub, so that no water is allowed to pass the wrong way for

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[Continued.]

Mr. Seton-Karr—continued.

for the turbine. On the wheel there would be say 20 cutting edges, moving at a rate of 15 feet a second, passing 10 cutting edges on the non-rotating of the turbine, and nothing could possibly be safe going through into the tail race.

5931. Does it come to this, that you think that very few, if any, fry could get through any turbine alive?—Yes, that is my opinion; if he is not cut he will be killed.

5932. How?—By coming in contact with the blades of the revolving part of the turbine and by pressure, similar to the way old salmon are killed in Mr. Adam's turbines. If they get past the blades they will have to encounter the crestree of the turbine before reaching the tail race.

5933. I understood you to say these two other turbines were a more modern kind than the other one?—Yes.

5934. Does it make any difference whether they go through either of them?—Old salmon could not possibly go through Mr. Adam's, and fry would be cut into small pieces by them. Old salmon can go through the New American, but if they do, they would be sure to be cut up.

Mr. Macartney.

5935. You are speaking of old salmon, are you not?—Yes; they cannot go through Mr. Adam's turbine under any circumstances.

Mr. Seton-Karr.

5936. Has a fry any better chance of going through that more modern turbine than this without injury?—He may not be cut into such small pieces.

5937. Without any injury, I said?—No, he cannot go through without suffering injury. He has three different chances to take. If he misses the first one, that is the knife, he then comes in contact with the pressure on the blade of the turbine, and if he misses that, he is caught by the cross-tree which supports the shaft on which the turbine revolves, and he is sure to get something there; he cannot go through with a 60-horse-power column of water, safe. I know, from experience of salmon fry that when they are in front of the fry guards, that if they get in any agitated, and come flat against the fry guards, the pressure of the river water will kill them, leaving the print of the bars in the fry guards on their sides.

5938. Does that in any way check the flow?—No; you might see that, perhaps, once in two years. When they are playing by themselves in the river, and one knocks the other so that he is caught with the stream and comes flat against fry guard, you will see the print of the bars on his body, and he is dead.

5939. It kills it, does it?—Yes.

5940. That is not usual, is it?—No; it is only when playing amongst themselves.

5941. Is it likely, when there is a large shoal of fry swimming about in front fry guard, that many of them would get washed up against the fry guard so as to interfere with the flow of the water?—No, because when I tested the flow of the water there was salmon fry there.

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Mr. Seton-Karr—continued.

5942. At that time it made no difference, did it?—Not a bit.

5943. Were they in the river or in the mill-race?—They were in the mill-race, because this fry guard is in the mill-race.

5944. How came the Cork Waterworks to go to the expense of putting up these small guards in front of their turbines?—They have the greatest respect possible for the salmon fishery business, and they hold with me that each trade ought to flourish. This year I know to my certain knowledge that, had fry guards not been in, there would have been millions of fry cut up.

5945. Did the conservators of the River Lee ask the Cork Waterworks to put up these fry guards?—Not of this description, but they did the others.

5946. Did they put these in of their own free-will, because they thought they would be better adapted for the purpose?—Because we get no loss of head, and the men have less work to clean it.

5947. It is one of the heads at the waterworks who cleans them?—We have four men for working the four turbines, two by night and two by day; one of those men attends to the fry guards and to the head-race. That is his business.

5948. And you think he has an easy time of it, do you?—He says so himself; at all events they are all delighted with this fry guard, because they say they can sit down and have a smoke and keep it clean comfortably; and I take care that I have no loss of head, so I am comfortable too.

5949. The waterworks incurred quite freely the expense of putting in these new screens, did they?—Yes.

5950. Who paid for them?—The Corporation Waterworks Committee.

5951. Was there any grumbling about it?—No, they asked no questions; only we always submit them to the conservators to get their approval, and see if they are satisfied before we put them in.

5952. Did they approve of them?—Yes; the only thing they want to be satisfied about is that the meshes are not too large.

5953. And you say those are five-sixteenths of an inch, do you?—Yes.

5954. Then they are less than three-eighths of an inch?—Yes.

5955. Who designed those guards?—I did.

5956. For the purpose of keeping fry out?—Yes.

5957. They were made in Cork, I suppose?—Yes; it is steel tin plate bent together, and thinner at the back, so that any small particles passing through here can easily slip off.

5958. That is in order to give the least possible resistance to the flow of the water?—Exactly.

5959. I suppose you will take those guards out in about a month's time from now?—They will be out this week; we always leave them there for three or four weeks after the fry have passed, so as to satisfy everybody. They do us no harm and we are in a hurry to take them up.

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5960. Taking

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Mr. O'TOOLE.

[Continued.]

Mr. Seton-Karr—continued.

5960. Taking an ordinary mill-race of a Run or bleach mill, would there be any objection, do you think, to putting a guard of that description in front of the turbine of such a mill, or any ordinary mill?—It would depend on whether the turbine at the mill was of proper size to suit the river. Some people put in turbines that are not at all proper.

5961. I am taking the case of a proper turbine; would there be any such objection to that fry guard?—There can be no possible objection to it.

5962. You do not think it would interfere with the flow of the water or the working of the mill, do you?—No; we have proof in our case.

5963. And do you think that what works well here could be equally well applied to any other place?—Yes, if everything is properly constructed. If you only give me a 50-horse-power boiler, and a man puts a 100-horse-power engine up, you cannot expect I am going to work the 100-horse-power engine properly. In the same way, if you put a turbine into a mill and you have only water to work a turbine half the size, you are not to blame the river for not yielding the water.

5964. Supposing the turbine was working all right without a guard, and then you put one of these fry guards in, would that interfere with the working of it?—It should not if you had a turbine of the proper size.

5965. Supposing you had a proper-sized turbine; I do not quite follow why the proper-sized turbine has anything to do with it; I am asking you as to the case of any mill which is working without a fry guard?—That would be no injury, simply because there is no loss of head.

5966. Do you say in any ordinary case, with an ordinary-sized mill-race, that if you put in one of these guards you do not think it will interfere at all with the flow of water?—No.

Mr. Macarty.

5967. Then do you withdraw the previous answer, or do you let it stand on your evidence?—Which answer?

5968. About the turbine being in proportion to the river?—I say that if a turbine is put in that is not proper for the river, of course, it would interfere with it.

Mr. Seton-Karr.

5969. In that case it would not make any difference whether a fry guard was put in or not, would it?—Not a bit; this fry guard will not reduce the head of water.

5970. And if a proper kind of turbine was not put in, it would not work properly, whether there was or was not a fry guard in front of it?—That is so.

5971. Did you have to increase the width of your mill-race when you put the fry guard in originally?—No, I reconstructed the whole race. When I went to the works, there were only two turbines, and I erected the two new Americans.

5972. That was only two years ago, I understand you to say?—Yes; we spent something

Mr. Seton-Karr—continued.

like 10,000 l. on all the alterations. We threw a water-wheel which was here away.

5973. At that time did you widen your race?—Yes; the water-wheel stood where that is, and we threw the water-wheel out, and brought the new turbine out into the tail-race.

5974. Did you have to widen your mill-race after putting in these fry guards?—No.

5975. Did you widen your mill-race in order to make room for the new turbine?—Yes; we took the water-wheel out of here and brought the turbines down here.

5976. Is it the fact that the head of water here inside this fry guard is sometimes higher than outside?—That would depend on the head-race. If the head-race here at that point is not of the area of all the sluices here, you will have a curve on the water's edge, that way (*describing*). That is a reduction of head.

5977. What is that from?—From the sluices consuming more water than can possibly pass through the aperture in front; you get a curve in that case below.

5978. That is not caused by the fry guard in any way, is it?—No. In my case I have an inch and a half more water at the turbines than there is on the weir; I get the curve on the reverse, because more water can come in than the turbines can consume.

5979. Is that the case when the fry guards are down?—Yes.

Chairman.

5980. Do you mean that the water-supply is greater than the turbine can consume?—Yes.

5981. If the water-supply is less than the turbine could consume there would be a curve, the reverse way, you say?—Yes.

5982. The point you make is, that the fry guard makes no difference in that respect?—Yes.

5983. If there is enough water it will come; if there is not enough it will not come?—Quite so.

Mr. Seton-Karr.

5984. I want your opinion quite clearly as to an ordinary mill-race; do you think the erection of that fry guard would interfere in any way with the working of a mill?—Not the slightest, from the fact that it does not reduce the head of water.

Mr. Tomlinson.

5985. Do I understand you to say that you have the water actually higher at this point than that?—Yes.

5986. Now have you ascertained that?—By gauges set up and marked.

5987. What does this line represent?—That represents the flow of water on a level with the Weir.

5988. From this point the water cannot flow over into the main stream of the river; it will flow over here, I suppose?—Yes.

5989. When it is up to this level of your intake it would flow over the weir, would it not?—Yes; we have always water over our weir; in winter sometimes we have 5 feet over it.

5990. Is the water over now?—No, it is very low now.

5991. Have

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[Continued.]

Mr. Tomlinson—continued.

5991. Have you fish passes on this weir?—We have two.

5992. Are they working effectually?—The conservators have approved of them.

5993. How long have you had them up?—Two years I think last year.

5994. Was this weir erected for the purpose of the waterworks, or was it an old weir?—It was erected by the old Pipe Water Company who supplied the City of Cork with water from 1776 until 1858, when the Cork Corporation bought their interest.

5995. Did they alter the weir when they bought it?—Not until four years ago when it was swept away by a flood.

5996. And then you rebuilt it, did you not?—Yes.

5997. Have you rebuilt it on the same lines?—No, we altered the shape of it, and made it longer.

5998. Was it then that you put the fish-passes in?—Yes.

5999. Are there any other mills on this river?—Yes, there is the Ballancorrig powder mills.

6000. Do they use turbines?—One very small one.

6001. Is that protected in any way?—I believe it is.

6002. Is that above or below you?—Above us, about 10 miles.

6003. Do you know what sort of grating they have?—I could not say; it is a very small affair; they have water wheels too.

6004. Who do those mills belong to?—They belong to the Government.

6005. You spoke of turbines being put in not adapted to the river; can you speak to any instances of that kind of your own knowledge?—No, I cannot.

6006. You cannot speak of your own knowledge of any case?—No; I have taken turbines out and put in water wheels in their place, and I have taken water wheels out and put turbines in to please the owners.

6007. Do you consider yourself a water engineer?—Yes, I am a mechanical engineer, and have been in practice since the year 1857.

6008. Are you acquainted with the construction of turbines?—I have made them myself.

6009. Supposing you were asked to put up a turbine in a river, your first investigation would be what kind of turbine would be suited to that river, would it?—The first thing I should do would be to measure the river and see the quantity of water at my disposal.

6010. Probably every engineer would do the same I suppose?—He should.

6011. And you are speaking of instances in which, I suppose, turbines have been put up without consulting proper engineers?—I should say so.

6012. But you do not know of any case do you?—I do not know of any case.

6013. Then is it purely a matter of surmise on your part that there is such a thing existing?—I have taken a turbine down myself and put a water wheel in place of it, but I did not put it up.

6014. Was that a turbine not well adapted to 0.80.

Mr. Tomlinson—continued.

the river?—The millowner did not like it, and said it did not do its work well.

6015. Was it your opinion that that particular turbine was not properly adapted to the river?—It was a 50 horse-power Schiefel, and the toe of the revolving part got out of centre, and wore the case so much that it became useless.

6016. That particular kind of grating is your invention is it?—Yes.

6017. Have you taken out a patent for it?—Next month I think he intends to take one out; I gave it to the manufacturer to let him make what he could out of it.

Mr. McCarthy.

6018. What is your view of turbines as a hydraulic motor?—If they are put to work fast-working machinery, that is to say, grinding wheat or spinning, they save an immense quantity of gear, as the speed is got up with one shaft. That is one advantage. You can put them into a smaller house and their first cost is considerably under that of a water wheel, but I do not see any other advantage they have over a water wheel.

6019. Have you any experience of weaving, or beetling, or factories of that sort?—No, I have not; I have experience of flour mills.

6020. Evidence has been given that they are valuable for the steadiness of drive. Do you agree with that evidence?—No, any machine that is put up right should drive steadily.

6021. Then you do not agree with the expert evidence of engineers who have had to do with weaving factories and who have given very strong evidence here that there is no drive as steady as that of a turbine, do you?—Not at all.

6022. That is not your opinion?—No.

6023. Have you any experience of weaving factories?—I have experience of mills.

6024. Of weaving factories, I said?—Yes, driven by steam, not by water.

6025. Have you never seen them?—No.

6026. Are you prepared to tell the Committee that you do not agree with that evidence?—I do not; a loom is no more than any other machine.

6027. There is evidence before the Committee of civil engineers who have had their attention specially directed to turbines, as to the effect they have upon driving machinery connected with weaving, beetling and other processes, and they have given it as their decided opinion that they give an immeasurably superior drive. That is the experience also of all the millowners who have appeared before the committee, do you say that is not the case?—It would not be the turbine that produced that, certainly. If the shafting was put up properly and the wheels also they would get a steady drive anyhow.

6028. Their deliberate evidence to the Committee is that it is the turbine that gives this improved drive. Do you agree with that?—It will give it in this way, that they get the speed up at once and they do not want so many cog wheels.

6029. I do not understand whether you disagree or agree exactly. The evidence is that the turbine gives an immeasurably superior drive over any motor. Are you prepared to say that that is not so with regard to weaving, beetling, and other manufacturing processes?—There is nothing

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Mr. J. McCarthy—continued.

nothing in the turbine that would make it steadier than any properly erected water wheel.

6030. You have no experience have you in these processes of manufacture?—No, I do not know anything at all about weaving, but I will put up a machine to drive looms.

6031. You are not prepared to dispute that evidence are you?—I say it does not hang at all on the turbine.

6032. Although you have no experience?—But I have experience in the machines.

6033. But you have no experience in the machinery of weaving factories, have you?—There is no more experience wanted, as far as steadiness is concerned, for a loom or beetling machine, than there is for a flour-mill, a steam-hoist or a locomotive.

6034. That is your view as a professional witness before this Committee, is it?—Yes.

6035. Do you know anything about the structural differences between a McAdam and the other turbines?—Yes.

6036. Do you agree that the McAdam is more likely to be dangerous to the salmon fry than the Loeffel; do you know the Loeffel turbine?—I do.

6037. Have you ever seen one working?—I think I have.

6038. Where?—In Cork.

6039. In what part of Cork?—There were two in the flour mill belonging to Dowden.

6040. Then you know the difference between a Loeffel and a McAdam, do you?—Certainly.

6041. Do you know that a mill-owner using a McAdam would be obliged to put up a much closer grating to protect the McAdam wheel?—All turbines and bucket wheels ought to have a grating.

6042. Do you know, as a professional man, that a mill-owner using a McAdam turbine, for the protection of the turbine itself would be obliged to put up, altogether apart from the question of the fish in the water, a grating of a much closer description than he would use to protect a Loeffel?—Quite so, that is correct.

6043. And that owing to the number of parts in a McAdam turbine as compared with the Loeffel it would be much more difficult for any observation such as salmon fry, wood, or anything else, to go through without being injured?—Certainly.

6044. You have told the Committee in your opinion that it is impossible for salmon fry to go through any turbine?—Yes.

6045. Do you include the Loeffel?—Yes.

6046. Do you adopt the expression of Mr. Bodmer that it is a mathematical certainty that they would be killed?—They could not go through without being injured; they must be injured in some way or other.

6047. Would it surprise you if you were told that a certain number of pieces of wood of that size had been passed through a Loeffel turbine and bore no apparent marks?—How did they get to the turbine.

6048. They were passed through; would it surprise you to hear that?—No; if I was at the turbine myself I would pass a basket full through and would not injure one of them.

Mr. McCarthy—continued.

6049. How would you do that?—I would reduce the head of water and keep the turbine going slowly.

6050. How many revolutions would you give it?—It would depend on the size of the turbine.

6051. Supposing they were passed through a turbine developing about 50 or 60 horse power with 100 revolutions a minute?—That would be a very small turbine.

6052. It is, compared to yours probably; what is your horse power?—Ours are seventies; 240 combined.

6053. Would you imagine pieces of wood like that could pass through a thirty-three inch turbine, running at 150 revolutions per minute, without showing any mark?—Had she the full mill on.

6054. There was no cross-examination as to that, but I understood, and I think the committee understood, there was no alteration made at all in the ordinary course?—What would not injure that would injure a salmon fry.

6055. Would you be surprised if a number of pieces of turnip exactly similar to those pieces of wood were passed through and were produced without showing the slightest mark or abrasion whatever on them?—No, I would not.

6056. You would not?—No, no more than I would with regard to these pieces of wood. You say you do not know whether the turbine was at its full work.

6057. I am giving you what I can as to the particulars. It was a 33-inch turbine, running at 150 revolutions per minute?—If she had very little work on, and very little water, these things would go through. That is not the way to do it. When there would be no work on you would want a comparatively small amount of water to drive the turbine, and the water would drive them through.

6058. Is it your opinion that under these conditions the salmon fry could go through?—You could not get salmon fry through in that way.

6059. Why would you expect a soft substance like a bit of turnip to go through, and salmon fry not to go through. The pieces were cut square, and not rounded?—You could not settle the date for salmon fry to go through at all, because they must go through at their own natural time.

6060. I am asking you what would lead you not to be astonished at the fact that a piece of turnip cut exactly like that would go through under your conditions; that is, with the mill not working, but the turbine wheel revolving at 150 revolutions per minute?—In that case the buckets would not be full of water, and this wood would float on the top of the water between air and water, and would get away.

6061. And why might not a salmon fry be on the top between air and water and get away?—I do not know.

6062. Have you any reason to think it could not follow the example of a piece of wood. Supposing the mill was working, and this wheel was doing its full work, would you be surprised to find that a piece of turnip had been passed through in that way?—If the turbine is at full work, and the mill was doing duty, I do not believe you could put any number of those through the turbine,

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Mr. Macartney—continued.

turbines, for they would stop on the top of the weir.

6063. You do not believe that; you think it is quite impossible?—If the head-race is proper they would float on the top of the water.

6064. Nothing would induce you to believe it?—No, I think not.

6065. Do you take the whole water of the river Lee?—No; at this time of the year we take it all.

6066. So that no fry going down can get down the river except by going into your mill-race?—Not now.

6067. Do you work night and day?—Yes.

6068. Then how do the fry get out of the mill-race?—When the river becomes proper for the fry to go they go themselves.

6069. I want to know in what way?—They go over the weir.

6070. But I understand that you are taking all the water of the river now, are you not?—Yes, just now.

6071. So that they cannot go?—Yes; they stop in front of fry guards.

6072. How long do they stop there?—For two months generally.

6073. For two months they are in your mill-race, are they?—Yes, more or less.

6074. Supposing a shoal of fry came, two months ago, into your mill-race, they would be there still, would they?—Yes, if there was no flood down the river.

6075. If a flood came down what would happen?—They would all be gone away.

6076. Where?—Down to the Atlantic Ocean.

6077. Where would they go to get into the river; they are opposite your bars. What would they do?—Swim away, and go over the weir.

6078. Will they swim back from your grating up the mill-race?—Yes.

6079. The way they came in?—Yes.

6080. And will they go back again into the river, and go over the weir?—Yes.

6081. Is that your experience?—Yes.

6082. Are you sure of it?—I cannot be sure of anything; I have seen it over and over again with my own eyes.

6083. You are perfectly certain, are you, that the fry that come down into your mill-race are stopped opposite your bars?—Yes.

6084. They may remain there two months, may they not?—Yes.

6085. When a fresh comes, do you say they go back up the mill-race?—Yes.

6086. And get back into the river over the weir?—Yes, and tail down the weir.

6087. From personal observation, you are sure of that?—Yes; and more than that, I will get you old slats at the back of the fry-guards.

6088. How do they get there?—They get through the front fixed gratings. We have another set of gratings through which they cannot pass, and when the men are slipping these gratings down, we have had thousands of salmon between the fixed grating and those bars. There are some slats at present on the other side of them.

6089.

Mr. Macartney—continued.

6089. If they did not do this, there would be no way of getting down the river at all, would there?—They cannot go any other way, except through the turbines or over the weir.

6090. Two of those turbines are McAdam's, are they not; what are the new ones?—New Americans.

6091. Are they like the Loeffel?—Yes, of the same description, made in Ohio.

6092. Do you not depend on the turbine alone, do you?—No, we have steam.

6093. Of course you could not carry on your work without auxiliary steam-power, could you?—No, the works would not supply the City with water at this time of the year unless we had steam.

6094. Do you say that that form of grating does not in any way materially affect the working of your turbines?—Not the slightest.

6095. You have a superabundant head of water, have you not?—We have the whole river.

6096. You have more than you want to work the turbines you are now working, have you?—Yes; we have always water going over the weir when we are in good order.

6097. Even now you have a greater head of water than is sufficient to work the turbines you are now working, have you?—No.

6098. Is it only just sufficient?—We have sufficient to work the two new ones; that is, we have about 120 horse-power by water.

6099. Have you anything to spare, do you think, in the head of water?—No, we have a little pond now.

6100. Any diminution of the size of the intake of your head-race would stop your turbines, would it not; supposing the intake was narrowed materially, would it stop you?—If it were narrowed so as to be less than the area of the sluices that supply the turbines, of course the result would be that the water towards the turbines would become lowered or form a curve.

6101. You would lose the efficiency of your turbines, would you not?—By all means.

6102. What did you say the total cost of those gratings was, 200 l.?—About 7 s. per square foot; it may be a little more or less.

6103. Does that include everything?—Yes.

6104. The fixing and the foundations?—No, that is making the frame and the tin-work, and the man's profit on it who made it.

6105. Apart from that, there would be the cost of the foundations, would there not?—Yes.

6106. There would be the expense of putting in the foundations?—Yes, that is extra. We have those in.

6107. Was your experience of that other sort of lattice that it gave you a great deal of trouble?—Yes.

6108. And do you think it would materially interfere with the working of a turbine?—No doubt; the water could not get through it fast enough.

6109. Is the Cork Waterworks Company a private company?—No, it is a corporation.

6110. So that, as the corporation do not pay it out of their own pockets, the question of expense

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[Continued.]

Mr. Macartney—continued.

is immaterial to them, I suppose?—No; we have the lowest water rate in Ireland.

6111. But they would not hesitate to put up something like that?—To protect the salmon they would not, if it cost four times as much.

6112. You seem to be on uncommonly good terms with the Board of Conservators?—I do not know.

6113. You have got on very well together, have you not; you have always done what they wanted, have you not?—The corporation look upon it in this way that they have no right to injure the fish, and of course use every means to protect them.

6114. But the people who pay for the cost of erection are not the Cork Waterworks, are they?—They are the community. If you destroy one trade I suppose you injure the whole community. There are a great many fishermen in Cork who pay the water rate. I think the principal part of the fishermen of Cork live in the city, and therefore pay the water rate.

6115. And in your view it would destroy trade and injure the whole community, would it?—Well, our turbines yield to the Cork Corporation the value of 3,800 tons of coal in a year. To pump the same quantity of water by steam we should have to use 3,800 tons of coal.

6116. You say you employ four men for your turbines?—Yes.

6117. I suppose the river Lee does not bring much debris down, does it?—Yes, in heavy floods.

6118. But, except in floods, it is pretty clear, is it not?—Yes; there are small things, perhaps, which would wash through the new fry-guards, whereas on the old lattice they would become entangled.

Mr. Pinkerton.

6119. Are you of opinion that a properly constructed breast-wheel is as easily regulated as a turbine?—To give you a steady drive, do you mean?

6120. Yes?—Quite so.

6121. Do you require the same steady drive for a flour-mill that you do for a spinning-mill?—Yes, I should say so; especially now-a-days.

6122. Are you aware that five or six engineers have given evidence before the Committee, and every one contradicts flatly the evidence you have given?—I do not; but I know I am a practical mechanical engineer, and have never been out of the business since 1837, and have been engaged on all descriptions of engines, both steam and water engines.

6123. I have no doubt you have very excellent qualities?—I have put up shafts and drivings for flax-mills, too.

6124. But do not you know when that great mass of a breast-wheel is put into motion it is not so easily stopped as a turbine wheel?—Easier; I will undertake to stop with one hand the largest water-wheel in the world, but I will not undertake to stop our 54-inch turbines except I have two hands to help me, because I know where I would be found. I would be found shot up against the wall of the engine-house.

Mr. Pinkerton—continued.

6125. Do you suppose, in all England, Ireland, and Scotland, that you would find another engineer to give similar evidence to yours?—I think so. Any practical engineer could give so other.

6126. Mr. Moore's evidence was to the effect that fish never swim up the stream in order to regain the main river, and when they get into the mill-race they are compelled to remain there, unless they go over the bye-wash. Your evidence is to the effect that you have frequently seen fry going back into the main stream during flood time?—Yes; and when there is no water there they swim backward and forward and drop down again. They may go the length of this room and then you will see them coming back, tail on again, but you will never see their heads against that fry-guard. You will see their tails, but you will never see their heads against the crest of the weir. About a fortnight ago we had a fresh down, and you could see thousands of the tails of the old salmon above the water waiting for the flood to come. They were like a lot of small screw-boats until the water came down. They cannot pass over the weir with less than six or seven inches of water on, and then you will see them roll down away off to the Atlantic Ocean.

Mr. Tawlinson.

6127. Do the slats go down tail first?—There is no salmon goes to sea in any other way, nor fry either.

6128. With reference to the fry getting over the weir *here*, I suppose, when a flood came on, there would be a strong set of water down *here*, would there not?—Yes.

6129. The fish might be carried in that direction by the set of the water, might they not?—I will show you how the fry actually go, from watching them. They come down when the water is very low in the river, and they rest against that fry-guard. They may swim about at that distance when the water is low. The sunshine will bring them out. Perhaps you cannot see one at all, but the sun will bring them out, and if the wind is in the north they sink to the bottom. So they go backward and forward, and the very instant the water gets coloured with a rise, and the water is turbulent *here*, they swim away. The perfection of a turbine is not to have any speed on the water entering or leaving. If you could accomplish that you would get 100 per cent. out of the turbine, whereas now you can only get an average of 73 per cent. I have tests for which the Corporation paid, showing that to be so. The water *here* then is almost dead, and in that water salmon fry will not stop. I have proved that beyond all doubt, even this year. We had a great quantity of them up against the fry-guard, so much so that you would think a cup of water would not come through at all; but they never interfered with the water in the least. I shut all these sluices down, and everyone of the fry that were there went over the weir. Fry or salmon will not stop in water that is not running, it does not matter where it is; they will not stop in it.

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[Continued.]

Chairman.

6130. As soon as the influence of the stream went in that direction they went tail foremost down there, did they?—Yes; I bring the salmon from the bottom reach here through sluice gates, round *Aere* and up the river. When there is no water, as at the present time, I bring them from the tail race round through a sluice that I have, and out like that. I shut all the water off *there*; the water becomes dead in the tail race, and I open the sluice *Aere*, and I get water from the south channel; and the very minute a salmon sees the water running through he goes like a race-horse for it, and jumps right through.

6131. Then you assist the salmon which are running up the river?—Yes.

Mr. Tomlinson.

6132. Are there any coming up now?—Yes.

6133. Then you assist the salmon when they are running up?—Yes; we put those gratings especially there.

6134. Do you find by thus assisting the salmon and assisting the fisheries it costs you anything?—Only just for the men's time in opening and closing the sluices.

6135. Would it be an inconvenience to an ordinary mill-owner to do what is necessary to help the salmon?—Of course it would be an inconvenience to him, because, perhaps, the mill-owner wants too much. I hold that the river should be kept stocked with salmon as well as the manufacturer's purses with money, by the use of the water, because the salmon fishery is very lucrative in Ireland.

Chairman.

6136. What do the Cork fisheries let for, do you know?—I could not tell you.

6137. If the river fishery is not maintained there would be no fishery in the sea, would there?—No.

Mr. JAMES PATERSON, is called in; and Examined.

Mr. Tomlinson.

6144. You are a barrister-at-law, are you not?—I am.

6145. Do you practise in England or in Ireland?—In England.

6146. Have you given a good deal of attention to the law as to mills?—Yes, I have.

6147. That is a very old law, is it not?—It is.

6148. What do you say as to the relative positions of the fishery laws in Ireland and in England?—The fishery laws of Ireland have always been considered more advanced than those in England. The English fisheries were very much improved by imitating a great many things found in the Irish fisheries.

6149. In what sense do you see the word "advanced"?—They are more detailed, and grapple with more of the difficulties arising in that kind of legislation. Up to the year 1861 there were practically no laws in England at all regulating salmon fisheries.

6150. At that time the protection of salmon in this country rested upon the common law, did it not?—

Mr. Tomlinson.

6138. You do not mean to say that the sea-water comes up so far as that, do you?—Yes.

6139. Then how can you keep your sluices clear?—It is only the spring tides that come upon us to any extent.

6140. Then with a spring tide you have to stop your turbines, do you?—No; we work through them.

Mr. Macartney.

6141. There is no back-water thrown on your sluice?—There is; but we have power enough in the head-water. We do not run at so fast a speed when the tide is there.

Mr. Tomlinson.

6142. Supposing a turbine is arranged like this, and there are salmon *Aere*, and assuming there is a river where there is a great deal of poaching; would it not afford opportunities for poaching?—There is a water bailiff for watching the salmon there; fishery conservators generally have a bailiff there.

6143. But I suppose it would be difficult to keep people from poaching here, would it not?—It would be, no doubt, if there was not a man here to watch them. But we take the salmon right round here. We get them by stopping the turbine, as salmon will not stop where the water is not in motion. In the same way, when fry are at the fry-guard, when they find the water getting dead run away from it; I have proved it over and over again. I have stopped the turbines, and the moment I do, you will see the fry run away and go over the weir, but they go down the weir tail end; there is no doubt about that.

Mr. Tomlinson—continued.

not?—Very much. There were old statutes, but a great many of them were extremely difficult to construe or to obtain much assistance from.

6151. What would you say is the position of the mill owner, according to the common law?—According to the common law (of course the whole law relating to mills and fisheries is founded on this), a running water gives rise to certain rights to each of the persons who have lands on the banks of the river. I am assuming, in the first place, that this is a river frequented by salmon. Salmon, of course, have a migratory instinct. The common knowledge of the day now is that salmon come up every year from the sea, and spawn in the tributaries in the upper waters, and it is absolutely essential in order to keep up the supply of fish in a particular river that there should be no obstruction to the passage of fish either up or down at any time. The instinct of the fish leads it to travel.

6152. Do I understand you to say that by the common law there was any special protection given

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given to salmon?—I do not know that there is any difference between salmon and other fish in some respects. But the moment one finds out, and, of course, the whole law from Magna Charta carried downwards shows that people very soon found out that salmon could not be maintained in a particular river unless obstructions were removed to a very large extent, the common law applies. And the rule as to mills, of course, arises out of some conflict which exists between mills and the effect of mills upon the migratory instincts of the fish and the fishery-owners, to whom you may say the right of catching the fish exclusively belonged.

6153. I suppose mills are very ancient in this country?—Yes, they are, and I suppose in all countries they are very ancient. They were generally on a small scale, I presume, until recent times, so that a small mill on a river would really operate without any prejudice at all to the fishery rights. You may say, supposing it was a salmon river, the mill being of a small size, probably, would not produce any appreciable effect at all on the fish one way or the other.

6154. Are mills mentioned as a property in Doomsday Book?—Yes, I think they are.

6155. You say these old mills were probably small?—Yes, I should say so.

6156. Is it an incident of every mill that there should be a weir across the river and a mill-race?—Quite so.

6157. Then whatever the river is, if there are ancient mills it implies also that there are ancient weirs, does it not?—Quite so, there could not be, I should say, a mill without a weir of some description to keep up a head of water.

6158. Are there any rights at common law to arrange weirs so as to allow the passage of salmon?—There is no right at common law beyond this: that all the persons who have property on the banks of the river have of course between them the exclusive right of catching the fish in that particular river. I am talking of a river above the tidal flow. All the persons interested in that river have a right to catch the fish and to make such use of running water as their position on the banks of the river enables them to acquire. For instance, one right of running water is to have irrigation; that is to say, part of the river diverted into the land by means of small courses or channels. Another right of running water is to supply one's cattle with drink; and also to take the water for household use; and another right of course is to have the free passage of fish, because otherwise the right of fishing, especially for salmon, would not be possible unless there were means of fish passing freely up and down the river.

6159. Then do you say there is a common-law right to have the passage of salmon fry?—Yes, I should say there was. For instance, if for the first time a man comes and buys a piece of land on a river and erects a weir, I should say that any of the riparian owners above that weir would have a right of action against the miller who raised a weir, on the ground that the obstruction caused by his weir prevented that owner from having the same supply of fish as he would otherwise have had.

Mr. Towlson—continued.

6160. And that would be a right at common law, would it?—Yes.

Chairman.

6161. Or from draining his land?—Quite so.

Mr. Towlson.

6162. That would be in a similar position to the common-law right to have water kept in a state of purity I presume?—Quite so. The common law looks upon a river as free from every obstruction; that is to say, such as it exists in a state of nature; and the person who goes and builds a weir evidently disturbs the position of the river altogether, and if he erects a weir which prevents fish from passing either up or down freely, he necessarily of course does so to the injury of persons who have fishery rights.

6163. But in the case of an ancient mill would the miller be able to plead prescription?—Yes, that gives rise to the whole difficulty. At first the mill-owner is subject to a variety of actions from his neighbours, and if those actions are brought against him any time during 20 years no doubt he would be practically stopped from carrying on his mill at all; but inasmuch as the injury arising from a dam is sometimes inappreciable to each individual interested, he seldom goes the length of bringing an action against the millowner; and the millowner, if allowed to carry it on for 20 years and upwards can set up the Prescription Act in defence, and exclude all further remedy to those persons aggrieved.

6164. Then, I take it from your answer, you regard it as inexpedient to leave the rights of riparian owners and others on rivers to the common law?—Quite so, it would be utterly impossible to work out a remedy with the common law; and that, I take it, is the reason why statutes go into the subject and lay down special laws.

6165. What kind of injury is the existence of a mill likely to produce?—An injury done by a mill, in the first place, consists in this: That it is a necessary part to erect a barrier across the bed of the river to pound up the water and keep it up at a certain head. That is one injury which necessarily obstructs the fish, or, at least, in most cases does so. Then, another thing is that there is always a mill-race, which diverts part of the stream, and sometimes nearly the whole of the stream down a side channel, and then passes the water over a wheel or through a turbine or some artificial restriction, and then there is a tail-race further down. At these points an injury to the passage of the fish is almost necessarily produced.

6166. Would you consider the wheels themselves cause injury?—They may, I should think, be a cause of injury, but not necessarily so. The worst injury, perhaps, that would be caused by the wheel would be that the fish in passing down the mill-race would necessarily be stopped at the wheel, and there might be a very considerable difficulty in the fish finding out a passage at all over the wheel or under the wheel.

6167. Do you consider that one source of danger is the curtailment of the rights of the public

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public or of others arises from the clandestine way in which it is done?—Yes, because mills grow up in a clandestine manner; that is to say, at first, when they are established, the owner is always subject to actions on the part of his neighbour owing to the injury necessarily caused by it; and that injury is so difficult to detect at any particular moment, and is so likely to increase by insensible degrees, that the parties injured do not know when to begin an action or how long to put it off. The consequence is, the remedy not being made available, a certain time passes, and then the miller is able to turn round and say:—“My mill, no doubt, might have been stopped; you might have prevented me having such a high weir, or keeping such mill-races, or dangerous places about my mill; but you have let it go on for 20 years, and you cannot bring an action against me.” I hold it now as a matter of right.

6168. Would you consider 20 years sufficient length of time to prescribe?—Yes, I think so.

6169. Is there any common law right to require gratings or other modes of protecting wheels or sluices?—I do not think there is, apart from the general fact that of course no person who sets up a mill in a river which has all these dangerous places about it can do so without being subject to an action; and whether the injury is caused by the mill-wheel or the weir or the dangerous mill-races, and so on, I think, would not matter; the substance of the action would be injury to the fishery rights near the mill. Nothing special would turn on the mere fact of there being no grating.

6170. By what statutory provisions have those difficulties been met up to the present time?—In Ireland, of course, it was found out at the time of the passing of the Act 5 & 6 Vict. that mills caused a great deal of injury to the fisheries, and that provision in the Act of 5 & 6 Vict. was passed for the purpose of trying to check, if possible, the mischief done by mills. Then we arrive at the 76th section, in which for the first time, at all events, in that consolidated Act, there was a provision for the purpose of insisting on gratings being placed in all water-courses which diverted water from the river, so as to prevent salmon being, as it were, imprisoned.

6171. This Act of 5 & 6 Vict. cap. 106, you consider a distinct advance on the previous provisions as regards protection of rivers, do you?—I think so; I have not examined the old Acts, but I should think that is the first time, probably, gratings were insisted on by statute.

6172. Do you consider that 76th section is a satisfactory provision?—Not at all; in fact, it leaves out the principal mischief, which is simply that which arises from the excessive desire on the part of some of the persons interested in the river to turn the running water into motive power for machinery by neglecting every other right which arises out of running water; and as the fishery right was no doubt the first right obtained out of the water, and the moving power for machinery being, of course, subse-

Mr. Tomlinson—continued.

quent to that, and necessarily inconsistent to some extent with the other, the consequence was that it was utterly impossible to have both without some qualifying enactment.

6173. But this 76th section limits the right of the millowner to a considerable extent, does it not?—It does not, for this reason: the words, “As a moving power for machinery” except out of the enactment the obligation of putting any gratings to a mill-race at all; so that practically it did not do any good at all.

6174. Then the vice of that was the exemption as to moving power for machinery, was it not?—Quite so.

6175. How was that remedied?—That was not remedied until a later statute was passed, in which the tables were turned to a certain extent; and the Legislature, instead of allowing mills to be an exception to that 76th section, by the Act of 32 Vict. cap. 9 (the Act of 1869), for the first time in the Irish legislation removed the exception which had formerly been allowed in 5 & 6 Vict., and mills were expressly brought by that section within the scope of the 76th section of the previous Act; so that at that date it became the same thing as if in the 76th section mills had been included in the operation of that 76th section.

6176. Before you go to that Act will you deal with the Act of 1863?—That Act made a special enactment as to a turbine or similar hydraulic machine. That practically would have been included under the words “a moving power for machinery.”

6177. That is to say it would have exempted from protection turbines as well as wheels?—Yes, turbines as well as wheels were up to that date expressly out of the 76th section, and not included at all.

6178. Would it be your opinion that a prescription right and a common law right to the use of the wheel would have carried the right to the use of turbines?—I think not; first, because the rule is, in reference to all those rights, that if a person introduces a new injurious mode of using running water he is not allowed to vary the way by which he uses the water. He must keep to the particular mode by which he has hitherto appropriated the motive power of a river; and I should be of opinion, certainly, that a turbine was a totally different thing from an ordinary bucket wheel.

6179. Then, so far as concerns turbines, the fishery owners and people who are interested in fisheries would be in a materially worse position under the Act of 5 & 6 Vict. sect. 76, than they would have been under the common law, would they not?—Quite so; that is to say, I should say a person who erects for the first time a turbine in a river is still subject to an action on the part of his neighbours.

6180. The mere fact of a prescription to use a wheel would not entitle him to set up that defence, would it?—It would not entitle him to set up the defence that he had previously used the wheel.

6181. Does the Act of 1863 give effective protection to fisheries as against turbines?—It may be a matter of opinion, of course, what kind of gratings

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gratings should be set up; but the general words of that section are, "Other efficient means."

6182. What is the section of the Act of 1853?—The 30th Section, 26 & 27 Victoria. But the gist of that section is that the owner of the turbine is bound to find out some efficient means to prevent the fish being obstructed or injured.

6183. Then in what respect do you say that clause is defective in giving sufficient protection?—It is not defective if taken by itself. As applied to turbines it is as well enough, because it practically throws the duty on the owner of the turbine of finding some efficient means to prevent salmon from passing into the machinery; so that so far that was an efficient protection.

6184. In what respect was the law left in an unsatisfactory position at the passing of the Act?—Because it only dealt with one particular hydraulic machine, namely, a turbine, and left out the ordinary mill-wheel.

6185. Then, notwithstanding the previous enactments, you still wanted better protection in the case of a mill-wheel, did you not?—Quite so; that was really introducing a restriction only which was confined to turbines, but which did not touch mill-wheels.

6186. Was the object of the Act of 1869 to cure those defects?—I think, evidently, it must have been; because the very words of that section show that, whereas up to that date mills were not at all under the restriction of the 76th section, that 4th section of the Act of 1869 expressly puts mills under the same restriction as any other mode of diverting water from the river.

6187. Do you consider the Act of 1869 left the protection of Irish fisheries in a satisfactory condition?—So far as mills are concerned, yes; I think it was a very fair protection.

6188. I do not know whether you have listened to the evidence we have had here, or read it?—I have read some of it.

6189. Have you heard some of the witnesses state that the clause in that Act with respect to preventing further obstruction by dams is ineffective?—I think some of them touched upon it; but I did not agree with their view at all. I think some of them said there was no penalty, which, I think, is quite a mistake, because the 4th section practically puts all mills under the penalty of the 76th section, 5 & 6 Vict.; but if you repeal that 4th section, of course the old law remains. That is to say, there is nothing binding millowners at all as to gratings.

6190. Then, in your view, if those who took action to protect public rights from injury by the erection of dams failed, it was the fault of the method of proceeding?—Quite so. The effect of the section is this: that ever since that date, which is 1869, no person who has a mill and mill-race, and so forth, is to be allowed to set up any complaint about the obstruction caused by gratings, unless he goes to the Inspector of Fisheries, and proves to him that the grating which he is bound under the 76th section to put up will prevent the efficient working of the machinery; and unless he has that protection, he is, of course, liable to be proceeded against under the 76th section.

Mr. TOMLINSON—continued.

6191. Then do you think as things now are the conservators, if they use all their rights, have adequate means of protecting the rivers?—Yes; I think they have.

6192. Do the conservators find any practical difficulty about it?—Yes; I think they do. The want of money, I think, is their great difficulty for the purposes of enforcing this section.

6193. What do you know about the financial position of the Board of Conservators?—Having had great experience in England, and having been the Chairman of the Special Commissioners in England, I happen to know that the great want of funds and the difficulty of raising sufficient funds to enforce the statutory penalties, and so forth, against people who offend against the Act, is a chronic grievance.

6194. Are salmon fisheries of any pecuniary value?—Not very much. I never could see that they were particularly valuable; but it is a highly prized right, I know, in England. In Ireland, of course, they are much more valuable, owing to the abundance in which fish can be caught in the great rivers of that country.

6195. Are you intimately acquainted with the condition of the fisheries in Ireland?—I was a Commissioner of Fisheries myself for about a year in Ireland, and I believe I have seen most of the rivers.

6196. The impression left on your mind is, is it not, that in Ireland as well as in England the difficulty the conservators experience arises from want of money?—Yes, and therefore if more money is required from them they will be utterly helpless. That is to say, if they cannot maintain their fishery rights without expending money, practically they will have to submit to the grievances.

6197. Then, apart from the question of moral justice, do you think, if it is left to the conservators to give effectual protection to the fish they will be unable to do so from want of pecuniary means?—That is one difficulty in enforcing the statutes; but I think perhaps some confusion has been caused by the mode the Legislature has pursued. The 4th Section, taken in connection with the preceding Act, has probably misled a good many people in Ireland, and they may fancy they have no remedy under the 4th Section of the Act of 1869.

6198. What are the words that cause the ambiguity there?—The mode in which it is drawn is vague. It says, "In the construction of the said 'Salmon Fishery (Ireland) Act, 1863, and the Acts to be construed therewith, the exemption from compliance with the provisions of Section 76 of Act 5 & 6 Vict. c. 106, of owners, lessees, occupiers, and other persons in respect of watercourses, cuts, channels, or sluices, where such watercourses, cuts, channels, or sluices are constructed for the purpose of conveying water from any river frequented by salmon as a moving power for machinery, shall be deemed to extend, and shall extend, only to such cases in which, and for such periods during which, it shall be proved to the satisfaction of the said inspectors of fisheries that such exemption is necessary for the effective working of any such machinery." It requires very close attention

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tion to follow all that; but the effect of it I take to be this: that whereas the Act of 5 & 6 Vict. section 76, expressly exempted mills from the operation of that Section, the object of this was to abolish that exception altogether and to make it compulsory on the owners of mills, if they wanted to get an exemption under the 76th Section, to go to the inspector of fisheries and get a sort of certificate, or, at all events, a declaration, that they were satisfied that the gratings would interfere with the effective working of the mill. Of course that was a judicial power given to the inspectors, and the inspectors would, of course, be bound to hear both sides, and the evidence pro and con, before they came to a decision.

6199. Is it your view with the present state of the law that ineffectual protection is still given, and do you think that the protection is not quite sufficient at present: in fact, do you think the Acts do not enable fishery owners to thoroughly protect their property at present, in consequence of its obscurity?—The moment you arrive at a proper construction of the Statute there is a remedy, I think, now available to the conservators and so forth; but probably they have not yet quite appreciated the bearing of that section on the previous Acts, and they really probably are not possessed of the proper construction of that section.

6200. Have you considered Mr. Macartney's Bill, which we have before us I believe?—Yes.

6201. What observations have you to make upon it?—In the first place, I think that it would be a fatal thing to repeal those two sections, because those are really the only protection given at the present moment against the mischief done by mills which have not proper gratings. I do not say that any particular form of grating is compulsory, but I think it practically throws on the millowners at the present time the duty of finding out what is an efficient grating, so as not to do any mischief to the fisheries. I think that is the effect of the present law; and of course if those two sections are abolished it practically leaves the miller entire master of the field, and he can do exactly what he pleases; omit to put up any gratings or take any steps whatever to avoid injury to the fisheries.

6202. Is that the ground of your objection to the third section of this Bill?—Yes.

6203. Do you take any exception to Section 4?—I do, because that practically casts upon the whole expense of remedying the mischief caused by mills upon the Boards of Conservators, whereas I should say that the original cause of the mischief is entirely due to the erection of the mill, and the duty of the mill-owner, I think, necessarily follows, namely, that he is not to throw upon third parties the duty of protecting themselves, but that it is his duty to guard or fence his own property in such a way as not to cause injury to his neighbours. That is common sense.

6204. Your chief objection to that clause is that it is throwing the expense upon the conservators, which ought, in your judgment, to be borne by the millowner; is it not?—Decidedly.

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Mr. Tomlinson—continued.

6205. Is there any part of this Bill to which you do not object?—Of course the 4th section is merely an imitation of the English Act, which is utterly useless and does no good to anybody, because, practically, no one can put it in force for want of necessary means to pay all the expenses.

6206. Is it your opinion that the present condition of the salmon fisheries in England is seriously impaired by want of proper protection against mills?—Entirely so; it has been always so ever since I had anything to do with it. I always saw that was a fatal omission in the legislation, and until that was cured practically the fisheries could not be much benefited, and from that day to this I believe this section has been utterly inoperative and has not enabled anything to be done at all.

6207. Then would you be inclined to desire that the law in England should be strengthened?—Yes; it is utterly inadequate at present. It has really done no good whatever; and to imitate the English Act is simply to adopt an inefficient mode of protecting the fisheries. It is really no protection at all; it is really a make-believe.

6208. Are you practically acquainted with the habits of salmon?—I have sufficient common knowledge of the habits of fish to enable me to apply the law to these subjects. With regard to the 6th section, I think that is useful, except that of course it looks also as if it threw the expense upon the Board of Conservators. I think that probably is a mistake; but that there should be some means of shutting out rivers which are already blocked and made useless, is desirable. It would prevent the loss of a great many fish.

6209. Would you agree to these concluding words: "but so that no water rights used or enjoyed for the purposes of manufacture, or agricultural purposes, or drainage, or navigation, shall be prejudicially interfered with thereby?" I do not see why that was put in at all, because it would be practically impossible to affect any water rights. The object of that I presume is to shut out one of the tributaries of a great salmon river from being entered by fish for the purpose of spawning, when it was well known that, owing to the number of weirs probably, or pollutions, or something else, the fish in going up that tributary would practically be utterly lost. And the object of that no doubt was to prevent the waste, as it were, of fish trying to find their spawning bed in a river which was practically shut out from them altogether.

Mr. Macartney.

6210. Do you occupy any official position now?—No, not now.

6211. You were Chairman of the Special Commissioners, I understood?—Yes; of the Special Commissioners for English Fisheries.

6212. And have you been an inspector connected with Ireland?—I never was an inspector; but I was also a Special Commissioner for Irish Fisheries for a short time.

6213. At what period was that?—That was about 1889.

6214. Were you a Commissioner when the Act of 1869 was being passed through the House?—

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Mr. Macartney—continued.

Yes, I suppose I must have been. I do not remember having anything to do one way or the other with it. I rather think it was before I became one.

6215. You stated that, in your opinion, there were certain common-law rights connected with fish in rivers at some remote period. Do you mean to say there were such common law rights so well defined that an action could have been sustained, we will say, by a riparian owner, who had a right to fish along his property, against some other person who was making use of the water of that river, say, 30 miles away?—Yes, if it prejudiced his right, and if he could show consequent injury.

6216. Do you say there was such a clear common law right that there could be a common law action?—Yes. Supposing, for instance, a person had erected a weir or a dam across a river frequented by salmon, and the effect of that, supposing it was sufficiently high, was to prevent the fish passing any owner whose land was situated immediately above that weir could bring an action against the person who set up that obstruction.

6217. When did the common law difference arise between rivers frequented by salmon and those not frequented by salmon?—Rivers in which salmon exist, of course necessarily are subject to that mutual relation between the parties who are situated on the river. On a trout river where the fish do not require to migrate, of course that probably could not be so.

6218. Do I understand you to say that, in your opinion, there was a common law right which affected only a river with salmon in it and would not affect a river with trout in it?—Quite so.

6219. You say that, do you?—That is what I say.

6220. Upon what, may I ask you, is that opinion founded?—It is founded on the law of nature.

6221. I want the law of England; the common law is not very often the law of nature. You say it was a common law right; are there any cases which would support your view?—Yes, plenty.

6222. Can you supply the Committee with a list of them?—Yes.

6223. I shall be much obliged to you if you would; do I understand you to tell the Committee that, in your view, there was ample protection at common law?—No; I say that there was, in theory, protection, but that it was unworkable from the difficulty that upper owners had in bringing actions against the offending parties.

6224. How do you mean "unworkable"; did the cases fail?—Supposing a dozen people were on the upper side of a weir, and a new man came and erected a weir which injured the whole of them, those owners equally would probably think themselves more injured than the others.

6225. You say there is a common law right which could be maintained at common law, and you say it was unworkable; I do not quite

Mr. Macartney—continued.

understand you?—It was unworkable because if, say, a dozen people were affected by a nuisance or anything else coming near them, probably no one would bring an action, unless one had the spirit to bring an action. Probably he would not do so unless the others combined with him, and it is so difficult to get combination that practically each person thinks "It is not my business, or "It is somebody else's business," and the real consequence is that no one brings the action.

6226. I want to remind you that you are founding your opinion on the fact that there are cases, and if there are cases they surely must have been workable, or the common law protection did not exist at all?—Of course, there may have been a case now and then, but it does not follow from that that it was an excellent remedy, and that people could resort to it with ease.

6227. But the common law is very clear, probably clearer than statute law, is it not?—I should say not, because the very object of the statute law is to redress the defects of the common law.

6228. You say there is more doubt about the interpretation of the common law of the country than there is of the statute law; is that your opinion as an expert?—As a general rule it is so.

6229. I should be very much obliged if you would supply the Committee with those cases in which you say there was a common law right which would have enabled a riparian owner, who had a right to fish for salmon at a certain part of the river, to prevent another riparian owner from putting an erection or obstruction in the river?—Quite so.

6230. Do you say the rights of the salmon fishery owners, which are now protected by legislation, were covered by common law right?—The whole object of legislation is to redress the defects of common law.

6231. Quite so; if the common law does not afford sufficient protection, then the legislation steps in?—Quite so, and fills up the defects.

6232. If we look at the case of salmon fishery laws that have been passed since the middle ages, it would appear that the common law is defective; would it?—So it always is.

6233. But I understood your position to be that there was an effective remedy at common law?—I did not say effective; I said there was a remedy, but it was extremely difficult to work it in such a way as to protect all the persons injured by such a thing as a weir in a river; it was open to each party, and each party could have brought a separate action.

6234. Do you say that the fishery laws in Ireland have been always in advance of those in England?—Yes, the legislation especially.

6235. There is an Act of 1861 in England, is there not?—Yes, that was the beginning of the modern statute law.

6236. It is an important Act, is it not?—Yes.

6237. Are there any provisions for gratings in that Act?—Yes, I think there are, but they are very defective.

6238. Are

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Mr. Macartney—continued.

6238. Are there any provisions for gratings with regard to mills in the 1861 Act, do you know?—I think not; it must be the Act of 1873 which contains them.

6239. Is there anything about gratings at all in the 1861 Act?—I think not; I rather think it was the Act of 1873 which dealt with the provisions about gratings.

6240. But are there any provisions at all in the Act of 1861 dealing with gratings?—Yes, I find the 13th section says something.

6241. What does it say?—"Penalty on company or person not erecting gratings to prevent the descent of salmon into artificial streams." There is a provision as to gratings "for the purpose of preventing the descent of salmon or the young of salmon, gratings shall be placed in such form and manner as may be approved by one of the inspectors in this Act mentioned."

6242. So that, at all events so far as England is concerned, there was a grating provision in the Act of 1861?—Yes, but I see the words "nothing is to apply to the passage of boats on any navigable canals."

6243. Does that apply to mills?—No.

6244. What does it apply to?—For supplying canals with water or supplying any navigable canal.

6245. Is there any provision with reference to protecting gratings on mills in that Act of 1861?—I think not, beyond that part which is confined to navigable channels.

6246. Then the next Act would be the Act of 1873, would it not?—Yes.

6247. And that makes certain provisions in regard to gratings, does it not?—Yes.

6248. Up to the year 1869 there was no power to place any gratings at mills in Ireland that did not use turbines, was there; that was the position in Ireland was it not?—Yes, practically.

6249. And in 1869 there was this peculiar clause, which is rather clumsily drawn, introduced into the Bill. Are you aware that when that Bill was introduced by the Government into the House of Commons, the 4th Section did not exist?—I am not aware of that.

6250. Are you aware that in introducing the Bill into the House of Commons the only occasion when anything was said about it, as reported in Hansard, was when the Attorney-General said it was merely a Bill for the purpose of transferring the powers exercised by certain inspectors of fisheries and to make them permanent?—I think you are talking of another Act.

6251. I am talking of the Act of 1869?—There are two Acts of 1869.

6252. I am talking of the Act which contains the exemption; when that Bill was introduced by the Attorney-General for Ireland on the part of the Irish Government it did not contain the 4th Section, did it?—I am not aware of that.

6253. And therefore if the Bill was circulated to people who were interested in salmon fishery, or in waters taken from salmon fisheries, there was nothing to lead them to suppose that there was any legislation before Parliament, except that which made permanent the duties of certain inspectors; was there?—Possibly.

6260.

Mr. Macartney—continued.

6254. But is not that so?—I know nothing about that; it might be so.

6255. So that if that Bill had been distributed or sent to millowners who were interested in taking waters from salmon rivers, there was nothing in it which might alarm them or excite their apprehension, was there?—I think you may say that.

6256. Do you agree with this statement of the law in Ireland which I am about to put to you; that the Inspectors of Fisheries have still power under this Act of 1869 to grant exemptions in regard to the 76th section of 5 & 6 Vict.?—Yes.

6257. But they have no power to grant any exemption with regard to the turbine clause of the Act of 28 & 27 Vict., the Act of 1863, have they?—Yes; I should say that section 4 would include a turbine, because it is simply "a moving power for machinery."

6258. In your opinion do you think the inspectors have a power to grant exemptions in respect of a turbine?—Yes I think so, because a turbine is simply moving power for machinery.

6259. Have you any knowledge as to what their practice is?—No.

6260. Then in your opinion have they similar power with regard to turbines?—Yes, I think so.

6261. I may inform you (I believe I am right) that the view they take is that they have no power to grant an exemption under the turbine clause; but that would be a wrong construction in your view, would it?—Yes, because that section of 32 & 36 Vict. contains the words "And the Acts to be construed therewith."

6262. I quite understand your view. In your opinion they can grant an exemption to cover turbines as well as the other thing?—Certainly.

6263. Would you not consider that the position that they are capable of granting exemptions for gratings but not capable of granting an exemption for turbines was rather anomalous? The object of putting up gratings under 5 & 6 Vict. is to prevent the destruction of salmon fry, is it not?—Yes, and salmon too.

6264. And the object of putting up the protection under the turbine clause was also to protect salmon fry, was it not?—No doubt, and salmon.

6265. Is it not rather anomalous that with regard to one set of things they have power to give exemptions but not with regard to the other, as they interpret it?—Yes, it would be I should say.

6266. Do you think that it is a satisfactory position for the law to be in with regard to the Conservancy Board and the millowners in Co. Antrim, that there is an Act in force which the inspectors have felt themselves obliged to grant exemptions from universally. We have in evidence before the Committee the fact that Inspectors of Fisheries have exercised universally in the county of Antrim with regard to the mills that are working there their powers of giving exemption?—Yes.

6267. So that practically the Act is a dead letter and the moment the Conservancy Board

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Mr. PATERSON.

[Continued.]

Mr. Macartney—continued.

attempt to enforce it the inspectors on being appealed to feel obliged to give exemptions?—They must be satisfied it is necessary.

6268. They did satisfy themselves. Do you think it is of any public advantage to keep an Act like that on the Statute Book?—Yes; because half the millowners might not make any complaint about it; it might affect the smaller class of mills; I do not know what particular class of mills there are in Austria.

6269. Would you think it desirable, in order to make the law uniform, if there is any doubt about the question of exemption, to attach a similar power of exemption to the turbine clause?—Yes, if it is doubtful.

6270. You think it would be reasonable to invest the Commissioners with the same power as regards turbines as with regard to the other things, do you?—Yes, I do not see much distinction between them.

6271. I suppose to your mind it is a perfectly reasonable thing if the millowner can really convince the inspectors of fisheries that it is impossible for him to comply with the requirements of the statute, except at the risk of having to close his works, that the inspector of fisheries should give him this exemption?—It is reasonable, but the inspectors of fisheries would naturally of course consider, that ever since 1869 the law has required all these millowners to keep a grating up along the head-race and tail-race; and the fact that that has been the law for 20 years would at all events prevent anybody who had set up a mill during that time from looking, as a matter of course, to that protection, because it is one thing to allow an old mill, that is to say, a mill that exists under the protection of the Prescription Act, and another thing to exempt or protect a mill that is set up for the first time after the Act of Parliament which expressly says it shall not be used unless it is accompanied with gratings.

6272. I will take the instance of a man who comes down, we will say, to the River Main and invests, say, 5,000 £. in obtaining a lease from a riparian proprietor, building a mill, and putting in his hydraulic motor, in the year 1865 we will say; in the year 1869 a Bill is introduced into the House of Commons containing no clause whatever referring to hydraulic motors; he has no opportunity, unless he is a member of the House himself, of becoming aware of any alteration in the law until this Bill is transformed into an Act, which places the effective working of his capital practically at the discretion of the inspector of fisheries. Do you not think that is rather a hard case too?—It is not a sufficient justification to a man that he has invested capital in buying a piece of the bank of a river, to set up a mill far too large for the situation.

6273. Why too large?—Because it is probable it could not be worked unless the whole motive power of the river could be poured into it.

6274. On what ground do you assume that. Pray do not assume anything of the sort. If you assume that, I will take a smaller sum of money?—It does not matter about the amount of capital invested, you must be sure you have

Mr. Macartney—continued.

a right to do what you are doing; it is not enough to buy a piece of land on the bank of a river to enable you to set up a large mill and weir and work it to the prejudice of your neighbours who are interested in other things, such as fisheries.

6275. But suppose the law does permit you?—But it does not.

6276. Pardon me; my case was that in the year 1865, we will say, a gentleman of capital desires to invest that capital in woollen industry, and goes down to the River Maine. He makes a bargain with one of the riparian proprietors, say Lord O'Neill, takes a long lease from him, for which he pays for the right of taking water from the river, which has been going on for a whole century, and is under the protection of the law, which in 1865 had not been altered?—The law did not permit that in 1865, or at any time whatever. The common law prevents it; it does not allow anyone to buy a piece of river and set up a weir.

6277. Suppose he bought a riparian ownership and took a lease, we will say, from one of the riparian owners, and, we will take it, even that there was an old mill-race there, which has been used for centuries, and he is desirous of having a woollen mill there, and he employs a large number of hands and goes there in 1865 and obtains this lease, and builds his mill and puts in an hydraulic motor?—Are you assuming he builds a weir also?

6278. No, I am assuming that there is no weir there. I am assuming he does not violate either the common law or the statute law at the time, and that he has full power to do all this in the year 1865. Then in the year 1869 a Bill is brought into the House of Commons. During the passage of that Bill through the House a clause is shot in, which is a very dubious and doubtful one to construe, but the construction of which I think you have given quite correctly; and that by that clause, suddenly the law is altered and he finds that his capital and the productive power of his mill is entirely at the discretion of the inspectors of fisheries; do not you think he has a right to feel aggrieved?—It is not exactly discretion; it is the judgment of the inspector on hearing both sides.

6279. But he has an absolute discretion, has he not?—No, he has no discretion whatever. He is bound just like justices of the peace, who are obliged to hear certain cases.

6280. Have they no discretion to dismiss or fine?—No discretion whatever. They come to a certain conclusion, but we do not call that a discretion at all. They are under a duty to decide according to the evidence, and both sides being heard, they either convict or not.

6281. At all events as his capital is then suddenly placed, I may say, at the judgment of the fishery inspectors, do not you think he has a right to complain?—There are a great many people who have obligations thrown upon them; look at the Public Health Acts, which every day are throwing a great many burdens upon people which they never dream of.

6282. Then

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Mr. PATERSON.

[Continued.]

Mr. Macartney—continued.

6282. Then do I understand from you, supposing the interpretation of the legislation in Ireland is correct which is placed upon it by the inspectors themselves, and by the Conservancy Board and every body in Ireland, that is that they have no power to give exemptions in cases of turbines whereas they have powers to grant it with

Mr. Macartney—continued.

regard to other hydraulic motors, that you think it reasonable that an exemption should be attached to the turbine clause?—I think it attaches now.

6283. But supposing it did not attach, I see there is a good deal in what you say?—Yes, quite so, to make it clear.

Mr. JAMES O'TOOLE is re-called; and further Examined.

Chairman.

6284. ARE these things put up for the purpose of the gratings?—Yes.

Mr. Tomlinson.

6285. This is the large gratings to stop wood. This is the medium size grating, is it not?—Yes.

Mr. Tomlinson—continued.

6286. Is this where you have the lattice?—Yes.

6287. And you simply put these things on to the frames where the lattices were before, do you?—Yes.

Tuesday, 17th May 1892.

MEMBERS PRESENT :

Mr. Cox.
Sir John Whittaker Ellis, Bart.
Mr. Macartney.
Mr. O'Neill.

Mr. Pinkerton.
Mr. Seton-Karr.
Mr. Tomlinson.

SIR JOHN WHITTAKER ELLIS, BART., IN THE CHAIR.

Mr. ALFRED MOORE MUNN, called in; and Examined.

Chairman.

6288. WHAT are you, Mr. Munn?—I am a solicitor.

6289. Where do you practise?—In the city of Londonderry.

6290. You are, I believe, solicitor to the Board of Conservators of the Londonderry Salmon Fishery District, are you not?—I am. I have been their solicitor for a period of about 15 years.

6291. What can you tell the Committee about the fisheries?—What I desire to explain to the Committee is the present condition of the law in Ireland with respect to gratings and lattices.

Mr. Tomlinson.

6292. Were you here on Friday last?—No, I was not.

6293. I do not know whether you know that Mr. Paterson, a barrister, gave evidence on that subject. Have you looked at his evidence?—I have not read his evidence.

Chairman.

6294. Perhaps you will proceed to tell us what the law is—I will tell you exactly, Sir, what the law is. There are three Acts, and one section in each of those Acts, which deal with the law in respect to the gratings and lattices. The first of those sections is the 76th section of the 5 & 6 Vict. cap. 106. That Act is commonly known as the Act of 1842. Under the provisions of that section it is provided, "that in all watercourses, cuts, channels, or sluices, constructed for the purpose of conveying water from any river frequented by salmon, for the supply of towns, the irrigation of lands, or any purpose other than the supply of water for navigation, or as a moving power for machinery, or for fishponds, there shall be placed and fixed by the occupier of such watercourses, cuts, channels, or sluices, at their points of divergence from and return to such river, and above and below such sluices, a grating or lattice (the space between the bars whereof shall not exceed two inches in any place) extending across the whole width of such watercourse, cut, channel, or sluices, and

Chairman—continued.

from the bottom of the bed or sill thereof respectively to the level of the highest winter or flood waters." Then it is provided that during certain months, namely, in March, April, and May, over those gratings or lattices there shall be stretched a wire lattice or net work of such dimensions as will effectually prevent the admission of fry.

6295. That is the Act of 1842, is it?—That is the Act of 1842, and I would draw the Committee's attention to the fact that that is not applicable to mills at all.

Mr. Seton-Kerr.

6296. Will you read the words of the clause?—Yes; I mention that point incidentally because it will turn up again in what I have to say.

Chairman.

6297. Do you say that section does not apply to mills?—It does not; and it is important that the Committee should have that before their minds in dealing with this Bill.

Mr. Tomlinson.

6298. What are the words excluding mills?—I will read them: "And be it enacted, that in all watercourses, cuts, channels, or sluices, constructed for the purpose of conveying water from any river frequented by salmon, for the supply of towns, the irrigation of lands, or any purpose other than the supply of water for navigation, or as a moving power for machinery, or for fishponds, there shall be placed and fixed by the occupier of such watercourses, cuts, channels, or sluices, at their points of divergence from and return to such river, and above and below such sluices, a grating or lattice (the space between the bars whereof shall not exceed two inches in any place) extending across the whole width of such watercourse, cut, channel, or sluices, and from the bottom of the bed or sill thereof respectively to the level of the highest winter or flood waters."

6299. The

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Mr. MUNN.

[Continued]

Mr. Seton-Karr.

6299. The effect of that is quite clearly to exempt mills from the operation of this Act, is it not?—That is so; from the Act of 1842.

6300. Before you go any further will you refer to Clause 4 of the present Bill, and tell us what you think in view of what you have just said is the operation of the words in the 4th Clause beginning with "Provided always"?—I will read the words: "Provided always, that nothing herein contained shall affect the liability of any person to place and maintain a grating or gratings across any artificial channel under the provisions of the 78th Section of the Act of 5 & 6 Vict. chap. 106, nor shall authorize any grating to be placed so as to obstruct any channel used for navigation."

6301. That liability therein referred to is the liability, is it not, under the clause of the Act of 1842, which you have just read?—It is. It is perfectly unnecessary.

Chairman.

6302. Do you mean that the clause you read in the present Bill would abrogate the clause in the 1842 Act?—No; what I desire to point out is this, that from the words "provided always" down to the words "chapter 106," the words are simply ornamental. It is surplusage, and they are perfectly unnecessary, because the Section 76, to which they refer already, provides it.

Mr. Seton-Karr.

6303. We have not got it quite clearly. Do you mean this: that the liability under Section 76 expressly excludes mills from that clause?—Quite so.

6304. Therefore there is no liability, is there, as regards mills?—There is no liability as regards mills under the Act of 1842.

6305. Therefore the exception in the present Act referring to that liability is ornamental and misleading, you think?—It is entirely. It is misleading in this respect, that it apparently is put there with the intention (I do not say with any deliberate intention) to lead anyone to believe that there was some advantage or benefit given by this section which really is not so given. It apparently was put in because it was so provided in the English Act; it is taken almost verbatim from the English Act, and apparently was put in for that reason.

Mr. Macartney.

6306. I do not know whether you have any experience in drafting Acts of Parliament?—I have drafted a considerable number of Acts of Parliament, and I think the honourable Member did me the honour of introducing one which I had drafted myself.

Mr. Seton-Karr.

6307. I wish to ask you, as a lawyer, who has studied this fishery legislation, whether you think there is any necessity for those words at all?—There is not the slightest necessity for those words in this Bill.

Chairman.

6308. You say that what is provided for there is already provided for in the Act of 1842, do you?—Oh.

Chairman—continued.

—Yes, I say that what is provided for there is already provided for in the Act of 1842.

Mr. Seton-Karr.

6309. It is not quite that so much as that the words, "Nothing herein contained shall affect the liability," mean nothing at all by the wording of the Act of 1842; is that not so?—Yes, so far as mills are concerned.

6310. Will you go on with your explanation?—The next Act which deals with gratings is the 26th & 27th Vict. cap. 114, Section 30, that is the Act of 1863. That section was introduced after an inquiry before a Select Committee of the House of Commons, at which evidence was given with regard to the destruction that was done by turbines. In that section it is provided that, "Where a turbine or similar hydraulic machine which may be injurious to salmon or the young of salmon in their descent to the sea, is supplied from a river frequented by salmon, the person owning or using such machine shall, during the time in which such descent to the sea takes place, provide gratings or other efficient means to prevent such salmon or young of salmon from passing into such machine, and in case such means be not provided, such person shall forfeit a sum not exceeding 50 £, and also a sum not exceeding 5 £ for each day during which such injury to the fry continues." I would ask the attention of the Committee to the words that are used there, and, first of all, to the words, "Where a turbine or similar hydraulic machine which may be injurious to salmon." And then again to the penalty part in which it says: "A sum not exceeding 5 £ for each day during which such injury to the fry continues." I desire to point out that that is a reasonable and equitable law, inasmuch as it cannot be put in force against a millowner unless it is first proved that the turbine or similar hydraulic machine, which may be the subject of those hostile proceedings may be, injurious to the salmon. I may have necessity to point out a little later on that that has been decided by the present Recorder of Belfast in a case which was before him.

6311. Is that clause usually referred to as the turbine clause?—Yes; and I submit that under that clause millowners, whose motive power is derived by turbines, are amply and sufficiently protected by the words.

6312. How do you read the words, "which may be injurious to the salmon or the young of salmon." In other words, or whose shoulders is the onus thrown?—The onus is thrown on the complainant to show that the turbine may be injurious to salmon, and that has been so decided.

6313. In other words the conservators or fishery owners have to show that the turbine is injurious to salmon, have they not?—It is on the shoulders of the complainant.

6314. And do you consider that that is a perfectly fair and equitable state of things?—I do.

Mr. Cox.

6315. To be shown to whom?—To be shown to the court before whom such proceedings may be taken. The proceedings in Ireland are summary

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Mr. MUNN.

[Continued.]

Mr. Cox—continued.

nary proceedings, which are taken before justices, and in order to succeed in enforcing on a millowner that he shall provide gratings or other efficient means, and be failing to do so, it is necessary for the complainant to substantiate the case. The onus of proof, in other words, is thrown on the complainant to show the justices, or in an appeal, to show the county court judge, or a Recorder, that the particular turbine may be injurious to salmon or the young of salmon in their descent to the sea, and also, in order to enforce the penalty, the complainant has to show the injury for each day during which such injury was continuing.

Mr. Seton-Karr.

6316. You have said you knew of a case in which that has been decided. I think it would be as well for you to mention that case?—If you think it desirable, I will refer to the case. The case to which I refer is a case in reference to a prosecution which was brought against Mr. Webb, who was examined before your Committee. In that case the prosecution was by a Mr. Moles, who was the local inspector of fisheries, and the prosecution was brought in the name of Mr. Moles.

Mr. Macartney.

6317. Were you the solicitor having the carriage of the proceedings?—I was not.

Mr. Seton-Karr.

6318. That is the ordinary mode of proceeding, is it not?—That is the ordinary mode of proceeding, because the fishery laws do not provide any machinery by which prosecutions can be brought in the names of the Board of Conservators themselves. The Board of Conservators are a variable body, changing, possibly, every three years, and the result would be that you might have a large number of names to put in as complainants. Then the Act of Parliament provides that the prosecution can be brought in the name of any person. The prosecution I refer to having been brought in the name of Mr. Moles, the magistrates at petty sessions considered that the offence was proved, and they inflicted a fine on Mr. Webb. From that conviction Mr. Webb appealed to the Recorder of Belfast, and he reversed the magistrates' decision on these grounds. He stated, "That it was necessary to prove that the turbine or hydraulic machine was of such a construction that it was injurious to salmon and the fry of salmon, and that they did pass into it. Mr. Moles said he had not examined the machinery, and that he knew nothing at all of its nature, and it was quite evident he was not a person competent to form an opinion as to whether the machinery was sufficient or not. But he said his observation would supply that defect of knowledge, because on two dates nearly a year ago he saw some fry below this turbine-wheel which had been crushed, and he came to the conclusion that they were destroyed by the wheel. He had done nothing to test whether this machinery caused the injury or not. Even if two or three salmon fry found their way into the turbine, it would be a strong contention to say that they went in wholesale, and that this

Mr. Seton-Karr—continued.

was a violation of the Act of Parliament. The Act provided that turbines should not be used as a means of destroying salmon fry, but it never intended the fact of a small fish going into it to constitute a violation of the law. That was a criminal prosecution, and the burden of proof lay on the prosecution. In his opinion they had failed to prove their case, and he must reverse the decision of the magistrates with 40 s. costs."

Mr. Tansin.

6319. What are you reading from?—I am reading from an extract from the "Belfast Northern Whig," which is a local paper, and a very accurately edited paper so far as my experience goes. I need not tell you that it was a matter which was exciting general attention. I would refer also to another paragraph in that extract. Mr. Webb was represented by one of the leading counsel on the North Eastern Bar, Mr. Dodd, Q.C., and in his speech to the Recorder, in stating the case of his client, he said: "The law under which the prosecution was brought was a safe and sound law if properly administered, and it was because he wanted it properly administered that Mr. Webb appeared before the Court on that occasion."

Mr. Seton-Karr.

6320. Is there any other point with regard to that which you wish to bring before the Committee?—There is another point which I wish to mention. I understood it was alleged that the Recorder had stated that he did not believe Mr. Moles' evidence, and that he was a person unworthy of credit. I wrote to the solicitor, Mr. John K. Currie, who had the conduct of this case, not only in the petty sessions, but before the Recorder, and I have his letter, which I will hand in. It is dated the 9th April 1892.

6321. Will you read the letter?—I will. He says: "In reply to your letter of the 8th instant asking for the ground upon which the Recorder of Belfast reversed the decision of the magistrates on appeal in the case of Moles v. Webb, I beg to inform you that the Recorder held that it was necessary for the complainant to prove that the defendant's turbine wheel was of such a construction that it was injurious to salmon or the fry of salmon, and that they actually passed into it, and that the onus of such proof lay upon the complainant. The defendant produced a large number of workmen from his place to prove that no damage had ever been done to salmon from his turbine, and he also produced two engineers to prove the fact that his turbine was of such a construction as not to be injurious to fish; and, secondly, that fish, owing to their habits and instincts, would not pass into it. The Recorder consequently held that the complainant had not proved his case, and reversed the decision of the magistrates, imposing a penalty. In reference to the evidence given in the case by Mr. Moles the complainant, the Recorder stated that Mr. Moles was not a person competent to form an opinion on the engineering question as to the construction of the machine, and whether it was injurious to fish, upon which he could set in contrast to the evidence which had been given before him, but further than this no reflection

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Mr. MUNN.

[Continued.]

Mr. Seton-Karr—continued.

was made by the Recorder upon Mr. Moles's evidence."

6332. Then the prosecution simply failed on account of the want of expert evidence to prove the damage by turbines, did it not?—That is so.

Mr. Macartney.

6333. That is not quite so, is it; is not that a rather strong way of putting it. Were you present?—I was not present, but I understand from that letter which I have just read, and from the report which I have just read, that that was the gist of the Recorder's decision.

Chairman.

6334. That is the inference you draw; I do not think you can go farther than that, can you?—That is the inference I draw from it.

Mr. Tomlinson.

6335. The inference is that there was no proof that this particular turbine had done damage to the fish?—It was simply this, that the complainant had failed to prove that this particular turbine might be injurious to salmon or the young of salmon in their descent to the sea, and that is exactly what I am trying to impress upon this Committee: that millowners are sufficiently protected by the words of the section itself, and do not require any amendment of the law for their protection.

Mr. Seton-Karr.

6336. Do you consider that that is clearly established by that case?—Yes, that is clearly established by that case.

6337. Is there any other point you wish to mention?—That is the only other point with regard to the question of Mr. Moles and Mr. Wehh that I desire to put before the Committee.

6338. Now go back to Section 30, the turbine clause?—As it stands at the present time, so far as my explanation goes of the existing law, the only Act which really affects millowners up to the present is the 26th & 27th Vict. cap. 114, Section 30. That is the only section which really touches or affects millowners.

6339. You have not dealt with the point of exemption, have you?—No, I am coming to that. I only want to impress on the Committee that that is the only section, so far as we have gone, that deals with millowners.

6340. And which, by the way, Mr. Macartney's Bill proposes to repeal, does it not?—Yes, and which section Mr. Macartney's Bill proposes to and actually does repeal by the third section. The next enacting section which deals with gratings and lattices is 32 Vict. cap. 9, Section 4, which is generally known as the Act of 1869.

6341. Have you the Act there?—Yes.

6342. I think you might read the clause as it is not a long one?—The fourth section enacts: "In the construction of the said, 'Salmon Fisheries Ireland Acts, 1863,' and the Acts to be construed therewith, the exemption from compliance with the provisions of Section 76 of the Act 5th & 6th Vict. cap. 105, of owners, lessees, occupiers, and other persons in respect to watercourses, cuts, 0.80.

Mr. Seton-Karr—continued.

channels, or sluices, where such watercourses, cuts, channels, or sluices are constructed for the purpose of conveying water from any river frequented by salmon, as a moving power for machinery, shall be deemed to extend and shall extend only to such cases in which, and for such periods during which it shall be proved to the satisfaction of the said inspectors of fisheries that such exemption is necessary for the effective working of any such machinery." Now that is the third and last section which really deals with the existing law as at present in force in Ireland. I would draw the Committee's attention to that Section 4 in this way: It apparently has a double-barrelled effect, so to speak. Up to the time and immediately prior to the passing of that section, the 76th Section of the Act of 1842 did not apply in any way to mills, and that is apparently admitted by all parties. But by the operation of this fourth section, it not only granted a power of exemption from the provisions of that 76th Section of the Act of 1842, but it made the provisions of the 76th Section of the Act of 1842 operative as against millers.

Mr. Macartney.

6343. Would not you reverse it, and say, first of all, it made it operative with an exemption; would not that be clearer?—I adopt that. First of all, it brought the millers under the operation of the provisions of the 76th Section, and then it granted them an exemption, so that really, taking the Acts and sections as they apply to Ireland at the present time, you have to read the 76th section of the Act of 1842, and the 32nd Victoria, 4th section, together, as forming one code of itself in regard to all classes of mills. Then, with regard to mills worked by turbines alone, you have to read the 30th section of 26 and 27 Victoria, chapter 114.

Mr. Seton-Karr.

6344. The turbine clause?—The turbine clause, so that the mills in Ireland are really now regulated by the first and third Act read together, and the second Act deals with the question of turbines.

6345. By the fourth section of the Act of 1843, which you have just read, it is quite clear, is it not, that the liability from which mills were exempted in the Act of 1842, is now put on those mills; do you read the two together?—I do; I read the Act of 1842, 76th section, and with it, in order to bring mills within its provision, you must read the fourth section of the Acts of 1869 not of 1883 as you suggest; you must read those two together.

6346. Is there any other point in Clause 4 to which you wish to call the attention of the Committee?—The only point that I would suggest the attention of the Committee should be called to is this, that it is simply by implication that the 76th section is extended to millers by Clause 4. It is not expressly done at all; it is done simply by implication.

6347. There is no case, is there, deciding that point?—These Acts did come before the Court of Queen's Bench in Ireland in the case of *Bullantyne v. The Justices of Londonderry*, in which

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Mr. MUNN.

[Continued.]

Mr. Seton-Kerr—continued.

which it was held (I am sorry I have not the reference with me, but I think I am speaking correctly from memory) that the liabilities of the 76th section of the Act of 1842 were placed on millers by the operation of this fourth section.

6338. Was that distinctly held?—It was.

6339. Can you subsequently send to the Committee a reference to that report?—Yes, I can, if it is desired.

6340. I suppose it is perfectly clear to the minds of all lawyers?—Yes; and, as I understand, Mr. Macartney agrees.

Mr. Macartney.

6341. I do not dispute your view of the law as far as the Acts go?—Quite so. The only other point I wish to call the attention of the Committee to in regard to that Section 4 is this: I saw it suggested, I am not sure whether by Mr. Macartney or not, that this Section 4 had been imported into this Act after it had been drawn, and after it had been before the House of Commons, and that it had been slipped in in some way without the knowledge of the millowners, apparently, as far as I could see, the inference being at the instigation of a fishery owner or proprietor. I do not know if that is so.

6342. If you do not, it is better not to give any evidence about it, because I shall prove my case upon that point?—That may be so, but, speaking as to the probabilities, it would appear to me that that is not probable, and I will tell the Committee why. If a fishery-owner desired to have the law amended in that way, it would not have been by importing into an Act of Parliament an exemption. This fourth section expressly and apparently only grants an exemption, and it would appear to me to be reasonable that a fishery-owner would not promote a clause for the purpose of enabling the inspectors of fisheries to exempt millowners from the operation of an Act which really did not affect them, the 76th section of the Act 1842.

6343. But you admit that the clause did enforce the 76th section, do you not?—I admit that is the effect of it. By implication it brings into operation the 76th Section of the Act of 1842.

Mr. Seton-Kerr.

6344. You have given us an outline, so far, of the law at present in force in Ireland?—That is the law at present in force in Ireland; and with regard to the 76th section, of course, read with the 4th section, all millowners have got the advantages of obtaining from the inspectors of fisheries exemptions where they can show that it is necessary for the effective working of their machinery, and where it can be shown by them that they do no injury at all to the salmon or salmon fry. That is sufficient protection, I submit, for millowners in the exercise of their industry, as regards the 76th section; and as regards the 30th section, as I have already said, they are amply protected by the words as construed by competent judges.

6345. With regard to exemptions, in your experience have you ever known any difficulty in

Mr. Seton-Kerr—continued.

millowners obtaining exemptions from the turbine clause?—I cannot say that I have.

6346. Are you prepared to give any evidence on that point at all?—No.

Mr. Macartney.

6347. You do not say there is a power of exemption from the turbine clause, do you?—No, but I say with regard to the provisions of the 76th section there is, and I say with regard to the 30th section, which you call the turbine section, there is in the Act of Parliament itself a sufficient provision.

6348. I am talking about a power of exemption?—There is no express power of exemption given to inspectors of fisheries to relieve any millowner who works his machinery by means of a turbine.

Chairman.

6349. Certainly the evidence has been that there is a power, and Mr. Webb's evidence was that Sir Thomas Brady had exempted him?—If Mr. Webb said so, Mr. Webb, in my opinion, is clearly in error. I distinctly want the Committee to understand that there are in effect simply two Acts dealing with the law of gratings and lattices. The first of those deals with all mills driven by whatever power they may be; whether by turbine or bucket-wheel is immaterial. They come under the provisions of the 76th section of the Act of 1842, and from the operations of the provisions of that section the inspectors of Irish fisheries have power to exempt. That is perfectly clear and distinct. With regard to the turbine section, the inspectors of Irish fisheries have no power to exempt.

6350. I was under the impression myself that all the evidence had been to the effect that there was a power of exemption?—Only from the provisions of the 76th Section.

Mr. Seton-Kerr.

6351. Is it absolutely necessary, provided that damage to fish by turbines is proved, that fry should be protected?—It is.

6352. During the three months of the year when fry are descending?—It is, and very properly so. The order for exemption given to Mr. Webb was expressly with regard to the 76th Section.

6353. Will you explain shortly to the Committee how you think Mr. Macartney's Bill will affect the present law?—Mr. Macartney's Bill, adopting that phraseology without appearing to be offensive in any way, would have the effect simply of repealing the whole existing law with respect to gratings and lattices. It would simply annihilate the fisheries of Ireland, and it would simply work confiscation of existing fishery rights. That is the effect of Mr. Macartney's Bill in my opinion.

6354. And I take it, looking at the clauses of the Act, that is brought about in this way. First, that Section 3 repeals these two sections which are the present safeguards to fishery owners; and, secondly, that under Section 4 it establishes no efficient safeguard in their place?—Yes.

6355. Is

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Mr. Seton-Karr—continued.

6355. Is that shortly how we may take it?—Yes, I think so. It repeals the turbine section altogether. It repeals the 4th Section of the Act of 1869, and therefore it throws the fisheries (which is the word I prefer to use) exactly back to the position which they occupied under the 76th Section of the Act of 1842; that is, that it does not affect mills at all. If Mr. Macartney's Bill were cut short at the 3rd Section it would simply mean that there would be no existing provision in the law in force in Ireland to require a miller to put up any grating or lattice of any sort or description.

6356. In other words, millers might put up as many turbines as they liked without any protection whatever, might they not?—They might. Now, as I understand, Mr. Macartney, in order to meet that possible objection, introduces this 4th Section as a substitute for the law which be would have swept away. That is how I take it.

6357. Will you put clearly before the Committee what, in your view, are the main objections, and I believe there are two, to the operations of this fourth clause?—There are many objections. First of all it would be necessary to understand what exactly is meant by the section, because it is very ambiguous. I put it in an alternative form so that anyone interested can elect from which point they desire to look at it in. If you will allow me I will read a portion of the section to you, in order that the meaning of my objection may be conveyed to you. "Any board of conservators after due notice to the owner or occupier of any mill or other premises at the expense of such board during such period as may be prescribed in each year may order to be placed in any watercourse, mill-race, cut, sluice, or other channel for conveying water for any purpose from any river frequented by salmon." Then it proceeds. Now, the section does not state "by whom" it is to be ordered to be placed. If it means that the board of conservators may order these gratings to be placed by the fishery proprietors, or by themselves, or by their own employés, then the operation of the section is perfectly useless, because there are no powers given to carry it out, and I will show you why. First, if it is to be placed by the board themselves the use of the word "Order" is entirely misleading, because they cannot order themselves to do it. "Order" there would mean "authorise." That is, that the board of conservators themselves are authorised to do so. If the board are authorised to do so, then no powers are given them to do it, no funds are given them to do it, and so far as my experience goes, they have no funds for the purpose. But apart altogether from the question of funds they have no powers.

6358. Is it not the natural inference from the meaning of those words which you have just read that it is the board of conservators who are to place these gratings up?—It altogether depends.

6359. I want to know what your opinion is?—I must say I am entirely at a loss to know what it means. It all depends upon what construction you put on the word "Order." If "Order" means to authorise, then it would be as you say for the board of conservators to put the gratings up.

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Mr. Seton-Karr—continued.

6360. In the second line it says, "at the expense of such board." I want to know exactly what your view is, and what you would naturally infer from those words. Are they the parties responsible for putting it up?—I do not think you can put that construction on it if you look at the 5th section.

6361. Then you think it is absolutely ambiguous, do you?—I say it is absolutely ambiguous; but assuming that that construction is not the proper construction, and that it is not the board of conservators who are to put the gratings up, but that it is the millowners who are to put the gratings up, it is equally bad, because, if the millowner says: "I will not put them up" there is no penalty to enforce his putting them up. It does not matter how you look at the section, it is perfectly valueless. The construction that is put on this section by English writers, for instance, Mr. Budd, is the construction that I put on it, and that is, that it is a direction, or an authority given to the board of conservators to do these works themselves, and put them up.

6362. Do you mean that it is an order given by themselves to themselves?—An order given by themselves to themselves.

6363. It is quite clear that they have to pay for it, is it?—It is quite clear that they have to pay for it, and if they have to pay for it there are no funds provided; they have not sufficient funds to do it, and even if they had sufficient funds, to do it they have no powers to do it, and I desire to point out why that is. First of all they have no power to enter upon lands for the purpose of putting up a grating; secondly, they have no power to enter upon lands for the purpose of maintaining that grating; they have no power to take land for the purpose of erecting gratings either compulsorily or voluntarily, so that no matter how you seek to bring that section into operation it must fail, unless the millowner agrees. Then you will see the whole section is hristling with objections, and subjects of contention between the millowners and the conservators, because, first of all: There is a period during which this grating is to be placed. The grating is to be of a certain form and dimensions, and it is to be placed at certain suitable places; it is not provided by the section in any one way; either who is to prescribe the period, or who is to prescribe the suitable place, or who is to prescribe the form and dimensions of that grating. These are all elements which would come into contention, particularly if you had two gentlemen like Mr. Miles and Mr. Webb coming into contact. They would, naturally, I should say, disagree as to all these points, and the minute they came to a disagreement, the millowner would step in and say: "I object to your coming on my land at all for the purpose of doing these works, and you have no power given by the Act of Parliament enabling you to do so." That is not an imaginary contention, I think.

Mr. Macartney.

6364. Have you read the clause very attentively?—I think I have read it most carefully. That is not an imaginary contention, I think. With your permission, I will read you what

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Mr. Macartney—continued.

what the English section is on the subject, which I dare say you have read. You will find that this clause is a very poor imitation of the English Act of Parliament, and the English writers, and a most distinguished man, Mr. Willis Band, have the very same objections to the English Act which I have to this one.

6365. You have referred to Mr. Willis Band; will you give the exact reference to his book?—I will; it is a book which he published in the year 1876, and the pages to which I would refer the Committee are from pages 173 to 180. They all apply.

6366. Is he an authority on the subject?—He is, and has written some very valuable books on the English Salmon Fisheries, and the habits of salmon.

Mr. Tomlinson.

6367. Is the book you have before you a treatise on the Act?—It is "Band's Law of Salmon Fisheries in England and Wales," and it gives the statutes.

Mr. Seton-Karr.

6368. You were going to read to the Committee the clause from the English Act, on which you suggest this Clause 4 is based, were you not?—Yes, and if you follow the 4th clause of Mr. Macartney's Bill, while I am reading the English clause, you will see that that is so: "Any board of conservators, after due notice to the owner or occupier of any mill or other premises, at the expense of such board during such period as may be prescribed in each year, may order to be placed in any watercourse, millrace, cut, leat, or other channel for conveying water for any purpose from any river frequented by salmon, at or near the point of divergence from and return to such river, or either of them, or in any other suitable place, a grating of such form and dimensions as they shall determine." They are almost verbatim, the same. I desire to impress this point upon the committee; I am not fabricating an objection to the Bill at all.

Chairman.

6369. Will you give us what Mr. Band says?—The English law is almost verbatim with Mr. Macartney's Section 4. Now I will tell you what Mr. Band says with regard to that. He says at page 175: "It will be seen that although the Act gives boards of conservators power to erect gratings, the following points seem to be overlooked:—(i) No power is given to place the grating if the owner of the mill, or of the land where the grating is proposed to be put, does not consent; (ii) no power is given to the board to go on lands to erect the gratings; (iii) no power is given to purchase any lands requisite for the purpose. These omissions, coupled with the words that a grating is not to interfere with the effective working of any mill, will render the power in many cases inoperative." Further, in his work, on page 180, he deals with the use of the words "injuriously affecting."

Mr. Seton-Karr.

6370. Are those objections which you have just read to the English Act apply with equal force

Mr. Seton-Karr—continued.

to this Clause 4 in Mr. Macartney's Bill; do they?—They do; and I would desire to point out to the Committee further than that, that if the intention was to make the Irish law the same as the English law, it has not been done, for this reason, that, in importing into the Irish law the English law, who ever drafted the Bill, failed to make himself acquainted first of all with the provisions of the English law, and for this reason: Take, for example, the word "prescribed," which is the term used here in the 4th Clause. The words are, "During such period as may be prescribed." Now, under the Irish laws, boards of conservators have no power to prescribe anything; the only persons who have powers to prescribe at all are the Inspectors of Irish Fisheries, and they have powers to make bye-laws, whereas, under the English law, boards of conservators are given a power by the 36 & 37 Vict. c. 71, s. 39, expressly to provide and prescribe this very "period"; so that in order to have assimilated the Irish law to the English law, a similar power ought to have been imported into this Bill.

6371. Then are you pointing out that in Mr. Macartney's Bill he has kept the best part of the English Act out?—What is done is this: every clause, as far as I can see, which assisted or preserved the rights of fisheries has been omitted, and every clause which told in favour of mill-owners has been brought in. I do not complain of that. It is probably very reasonable from their point of view, but then it is right that your Committee should be made aware of that when you are dealing with this Bill. Further, if you refer to the word "grating," in Section 4 of Mr. Macartney's Bill; There is a distinction drawn between gratings and lattices, so far as I can ascertain or form an opinion, if you compare it with the use of the words "grating" or "lattice" in the 76th Section of the Act of 1842, which would be the only section left after Mr. Macartney's Bill had passed. So that the word "grating" in Section 4 of Mr. Macartney's Bill, in my opinion, could not be read so as to include a lattice at all, whereas in the English law the word "grating" has a distinct definition given it, but in the Irish law there is no definition given. I draw the attention of the Committee to the English Act 36 & 37 Vict. c. 71, s. 4, which gives a definition of the word grating to mean "any device," and I will quote you the exact words: "A 'grating' shall mean and include any device approved by the Secretary of State for preventing the passage of fish through any channel." So that a grating in the English Act might and would possibly embrace lattices, whereas a grating under the 4th Section here could not in my opinion possibly be extended to mean anything of that kind. So that under that section of the Bill in any case there would be no provision made at all for the protection of fry.

Mr. Macartney.

6372. Are you sure of that?—That is my construction of it.

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Mr. Seton-Karr.

6373. On that reading of this clause it would mean that under no circumstances would a mill-owner be obliged to put any lattice or fry guard up at all, would it not?—Under no circumstances would he be obliged to put up any lattice or fry guard.

6374. In other words, there would be no liability whatever on him even at the expense of the board of conservators to protect his turbines from fry, would there?—None, in my opinion.

6375. Are there any further points with regard to Clause 4 to which you wish to call attention?—Incidentally I would point out that there is no person directly entitled to "prescribe"; it may be the board of conservators who are to prescribe.

Chairman.

6376. But there are the words here, are there not, "a grating of such form and dimensions as they shall determine"?—If "they" refers to the board of conservators, of course that is so.

Mr. Seton-Karr.

6377. But you were laying stress on the word "grating" only, being used I understand?—I was.

6378. Whereas in the previous Act there was a distinction made between gratings and lattices?—Quite so. I would desire to point out with regard to this 4th Section that from the words that are used, namely, that this grating is to be put up apparently by the board of conservators or millowner whichever the clause may be taken to apply to, it is not to be put up if it in any way interferes with the effective working of any mill.

6379. The grating if put up sufficiently small to stop fry must necessarily remain there at all times, must it not; there is no power to put up the lattice, which it is suggested would only be required for a short time?—The lattice would only be required during the time fry were running, but there is no power to put lattices at all under this section. But in any case, if you did put up anything, I do not care whether it is a grating, or whether it is a lattice, if it in any way interfered with the effective working of the mill; then it is not to be put up at all.

6380. What is your opinion of the operation of those words?—My opinion is that it renders the whole of the foregoing part of the section perfectly inoperative, even supposing there was no other objection to it. In the first place, I will tell you why. It does not state here who is to decide whether any particular grating or lattice in any way interferes with the effective working of the mill, and the result is that you are thrown into an action at law or a suit in equity every time that you endeavour to put in force the section, because, supposing for one moment that a board of conservators required Mr. Webb, for example, to put up a certain grating or lattice at his mill, and he objected to do so, then there is no power to enforce him to do so. Supposing it is the board of conservators who are to do it, and that they do it, then Mr. Webb turns round and says: "You have not put this up in the proper place, and I will not allow it."

6381. Then he might say: "You cannot come on my land to do," might he not?—Yes.

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Mr. Seton-Karr—continued.

Then, assuming all these difficulties are done away with, if it interferes with the effective working of his mill in any degree, Mr. Webb immediately takes action against the board of conservators for that. Then it is a question whether a board of conservators would expose themselves to the almost certainty of an action at common law or a suit in equity. If they happened to be wrong, and it did effect in the slightest degree the effective working of the mill, they might be swamped in damages, and they have no funds that I am aware of to meet such proceedings. That, again, is not an idea simply originating in my own head alone. It has also struck Mr. Wille's Band, and in his work on the subject, on page 180, he deals with it. His words are very nearly the same.

6382. Will you read what he says on that point?—He says: "It will be observed that the words here used, 'injuriously affect' are very wide, and the interpretation they have received by the courts under the 68th Section of the Lands Clauses Consolidation Act is still wider; so much so that hardly any grating can be placed in a stream that does not in a greater or less degree injuriously affect the proprietor above or below it as well as the miller. The power given to boards of conservators as to gratings, although it appears very large, is in reality so fenced round by provisions and restrictions as to be very small indeed. And although, perhaps, boards of conservators have no more useful power than that of saving the young fry of salmon in their descent in the spring, and the spawning fish in their ascent in the autumn from the destruction that awaits them at mills, yet, as given by the Salmon Fishery Act, 1875" (that is the English Act with which the Irish Act is identical, as has been admitted) "if boards of conservators wish to keep clear of litigation, there is no power that will require greater discretion in putting into force than that of placing gratings in watercourses." It is right also to point out that in the English Act when the grating has been erected there has been a provision given by the Act of 36 & 37 Vict. c. 71, s. 61, which provides that the adjoining owners shall protect that grating. There is no such provision in this Bill at all. Those, I think, are the principal objections which I have to Section 4 of this Act. I may mention that owing to these objections that Mr. Band speaks of, the Act in England is practically inoperative at the present time, and I would refer the Committee to the reply of Sir Michael Hicks Beach to Mr. Sexton, who asked a question on behalf of Mr. Healy in the House of Commons on the 6th August 1891. I have an extract from the "Irish Times" in which his reply is contained.

6383. Will you read the material words to the Committee?—It is the first part of his answer; I need not trouble you with the whole of it. He says: "I am informed that the boards of conservators in England and Wales complain generally of difficulties which they experience in the erection of gratings at mills under the provisions of the Salmon Fisheries Acts in consequence of the absence of a means of determining beforehand the difficulties which frequently arise between them and the occupiers of mills on the subject, and

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Mr. Seton-Karr—continued.

and that in many cases they abstain from erecting gratings from fear of expensive litigation which might ensue, their funds being in most cases limited."

6384. That points out the very difficulty which you urge on your reading of this Bill, as created by the Bill, does it?—Yes.

6385. Can you give the Committee any reasons, why, in your view, millowners should bear the expense of erecting protective guards in front of their turbines?—I can, of course; from my point of view, which, I think, will commend itself to the Committee, my reason is this: The persons who are the cause of the necessity for those protective guards are the persons who ought to pay for them; the millowners have no common law rights to obstruct rivers with dams, or to divert the water from the rivers through their watercourses, or to put up such machinery as will be destructive to the fish in those waters; they have no common law rights to that effect; they may have acquired a right by prescription to do so by a user of 20 years, but they have no common law right to do so, and, under the principle of common law they are bound to use their rights so as not to injure their neighbours, and if they so use their rights as to injure their neighbours they are bound to make that injury good, and an action would lie against them in common law if they had not acquired, as they have in most cases, a right by prescription. So that, in asking the Legislature to make the millowner pay the expense of preventing an injury which is caused by their own action, you are asking them to do nothing but carry out the principle of the common law.

6386. And the tendency of the statute law, instead of giving them any right of that kind has always been in the opposite direction, has it not; the tendency of the statute law, as far as my experience goes, has always been to bring back the rights to the principle of the common law. For instance, where prescriptive rights have sprung up, it brings them back to the principle of the common law, just as in the case of the turbine section, it brings them back to the principle of the common law, namely, that the person who does the injury must provide, at his own expense, the protection which is necessary; it also is brought into operation for the purpose of carrying out the principle of common law by means of penalties so as to carry it out more expeditiously, and with greater facility.

6387. Then in throwing the cost on the board of conservators you say it is not only violating the principles of common law as you understand them, but also going against the tendency of statute law, is it not?—It is beyond all question and doubt a retrograde movement. Then again take this point. It is not a question of taxing the mill owning interest for the benefit of fishery proprietors. It is not a case of that kind at all. The millowners give no protection to the fish generally in the river and they are not taxed in respect of it. All they are asked to do is not to injure the fish, that is all they are asked to do, and it is exactly a parallel case for instance with the discharge of fax water or the discharge of poisonous matter into the rivers. Both these are perfectly contrary to the com-

Mr. Seton-Karr—continued.

mon law. You have no right to discharge fax water into, or alter the condition of, a river at all. If you have power to take water from it you can but you have to return that water and leave the river in the same plight and condition, as it was before. If it were otherwise any one would have a right to take water to the injury of all the people lower down. In the same way you cannot discharge fax-water and poisonous matter into the rivers and so injure your neighbours lower down, and the common law recognises that principle and the statute law carries it out by means of the fines and penalties which are actively in force at the present moment in the Irish Fishery Code. Now you could not say that a farmer who is prevented from discharging his fax-water into the river which borders on his land is being taxed, because a prohibitive penalty is put on him preventing his discharging fax-water into the river. Neither could you say for instance that a paper mill which discharges poisonous matter into the river is being taxed for the benefit of fisheries because the owner is made to take all the poison out of the stuff. Those are identical cases. I know a paper mill myself where it costs the owners a very large sum of money annually for the purpose of pounding and putting into ponds all the deleterious matter from their works so as to take this poisonous stuff out before discharging it into the river.

Mr. Picketton.

6388. Where is that mill?—That is at Ballyclare.

6389. It must have been recently they took those precautions, must it not?—It is done, and when objection was made as to their destroying the river with their poisonous water, that is what they did; I believe they are pumping this stuff at a very large cost into ponds for the purpose of settling and getting rid of this poisonous matter that is in it. Chemical works are exactly the same.

Mr. Seton-Karr.

6390. It is the same principle that is applied to the mills in Scotland, is it not? Do you know as a matter of fact that is so, namely, that they cannot pollute the river?—Yes, I am quite aware of that.

6391. I know with regard to the Tweed it is so?—Yes, that is so. Not only is it so; but take for instance the case of a railway. A railway is run through a man's property; the owner of the land adjoining is not asked to erect the fences round that railway or to maintain them. That is an obligation thrown on the railway company; they have to protect their fences, and really all that the fishery owners ask is that the millowners should protect their mill sluices.

Mr. Macarty.

6392. A railway company takes the property of other people; what property do you suggest the fishery owners have in the river?—For instance, an owner of a several fishery has a property in the fish.

6393. Where?—He has throughout the extent of his several fishery an absolute right to those fish within the ambit of his charter or patent,

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patent, and he has in addition to that a common law right to the protection of all those fish as far as they go.

6394. Has he any property outside the area?—I say he has a property in the fish that are there.

6395. Where?—Throughout the whole of the tributaries in the river from which he gets his supply.

6396. That is he can prosecute anyone for taking them, can he?—No; I do not say he can prosecute anyone for taking them.

6397. But surely if he has a property no one else has a right to acquire it, have they?—Other people have. For instance, a riparian owner has, but he has a right of protection over that.

6398. Then he has not a sole property, has he?—No, I do not say he has such a property as you would have in a book or in a £1 note in your pocket.

Chairman.

6399. Suppose the river were run out and diverted altogether, would the fishery owner have a right to say, "That water cannot and must not be abstracted from this river so as to destroy my fishery"; that is the real question?—Beyond all question of doubt. I will give you an example. Supposing there are 10 miles of river, and that, in an intermediate part in that river of three miles, I have my several fishery for salmon, and that a millowner at the head of that river if it were possible diverted that river round me he would destroy my fishery. Do you mean to tell me that I would not have an action at common law against him for damage that I sustained by reason of that destruction?

6400. No one has suggested that?—That is what I understood.

6401. I think it is a question of degree; if he has a right to the river he has a right to the water in the river, has he not?—You have no right to alter the plight and condition of the river. The law recognises the right of a salmon fishery owner to protection of the fish outside the extent of his actual property.

Mr. Selon-Karr.

6402. You were illustrating your point by reference to a railway were you not?—Yes.

6403. Mr. Macartney suggested in his question that property in fish was not of the same absolute kind as in land. That was the point of his question, but as a matter of fact your legal view is, I take it, that in the water which is leased or owned by the fishery owners, the fish is the absolute property of those fishery owners while it is in the water?—Certainly.

6404. Just as much as the owner of the land owns the land which is fenced by the railway companies?—Certainly.

6405. Your point, I think is, that in asking the millowners to pay for the cost of protecting the fish from turbines you are simply following out the principle of common law and statute law in every case?—That is all; and I am only asking them to do what, in my opinion, would be just and equitable. If they use such improved machinery, from which alone they derive the advantage (and, as far as I understand, they get

Mr. Selon-Karr—continued.

something like 25 to 50 per cent. increased power by means of turbines, which are essentially destructive to fry), then I think it is only natural that they should bear the expense and the risk of taking whatever means are necessary to prevent that destruction. It is just the same as if I had the power of putting into the river above Mr. Webb's mill, for instance, large quantities of some acid that would eat away his turbine once a week. I think he might very naturally complain, and very properly complain.

6406. Suppose, for example, a fry-guard was erected in front of Mr. Webb's turbine, and it was clogged up or stopped up by the matter that came down from another mill higher up the river, as a matter of fact, would Mr. Webb, in that case have a common law remedy against the millowner above who sent down such matter?—Beyond all doubt, if he sustained damage, and could show it.

Mr. Macartney.

6407. In case he was obliged by your action to put up a fry-guard, what then?—If Mr. Webb is obliged by an Act of Parliament to put up a fry-guard, that is a statutory obligation which he cannot resist, and if the result is that someone above sends down something from a scutch mill, so as to clog his fry-guard, beyond all question or doubt he would have a right of action against him. He has no right to send stuff down in that way.

Mr. Selon-Karr.

6408. I want to direct your attention again to the property rights in salmon. As a matter of fact, if injury is inflicted on salmon in a particular part of the river, you are not only, I take it, inflicting injury on that particular property, but you are inflicting injury on much wider interests, the interests of the whole river, are you not?—There is no question of doubt about it. This is not a question of proprietary rights; it is not a question of dispute between mill-owners and proprietors of salmon fisheries, and that is why I used the term "fisheries" generally. There are very large public rights outside that.

6409. In inflicting injury on fish in a certain district you are also injuring much larger interests, namely, the whole proprietary rights of the river, and in particular the large number of fishermen who are earning their living on the coast, are you not?—Yes, and those fishing under their common law rights in the public waters. Take, for instance, Inishowen; there are a large number of fishermen (I am speaking of a place I am intimately acquainted with) all round the estuary of the Foyle, where all the men fish on their public rights, and all round in Donagel Bay they fish on their public rights.

Mr. Pinkerton.

6410. They fish inside the three-mile limit, do they?—The fishermen fish up to within a yard of the martello tower at Green Castle. The three-mile limit you mean, I take it, is where the mouth of a river has been defined by the inspectors of Irish fisheries.

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[Continued.]

Mr. Pinkerton—continued.

6411. Is that so with regard to the mouth of the river Bann?—No, that is, I think a half-mile limit; that is, a certain distance out from the very mouth, which has been defined. Where the mouth of a river has been defined by the inspectors of fisheries there is a limit prescribed within which you cannot fish.

6412. Are you aware that the particular owners of that particular fishery employ a steam tug to roid among the fishermen's nets, and spoil and ruin their nets?—No; I am aware they have not.

6413. Have you ever heard any complaints about that?—

Mr. Seton-Karr.

6414. With regard to these proprietary rights, we have it in evidence, I think, that there are at least 1,000 men employed under their common law rights fishing on the coast?—I am sure 1,000 men is understating it and I will tell you why: there are a very large number of men who fish there who have no licence whatsoever.

6415. Injury inflicted on the fish in any district on the river would also inflict injury on those men's interest, would it not?—It would. Of course, if you destroy the salmon fry on the spawning beds you destroy the hen that lays the eggs.

6416. Therefore, allowing any legislation which inflicts an injury on what we may call proprietary rights up a river is a far more serious thing than the case of the railway and the land referred to, is it not?—I should think so, because you destroy other interests besides those particular interests.

6417. And you cannot separate those interests, can you?—You cannot separate those interests.

6418. It is the nature of the property?—It is the nature of the property.

6419. Therefore, in that view, legislation which deals with a question of that kind ought to be most carefully considered, you think, as affecting a very large and wide interest?—I here is no question about it.

6420. Has Mr. Willis Bund anything in his book with regard to the English Act being inoperative on this head?—Yes; he states that it is inoperative from the want of powers.

Mr. Macartney.

6421. What is the date of that edition?—1876.

6422. Does this Bill, in your opinion, affect in any way the question of fish passes?—I do not think it affects it in any way.

Mr. Seton-Karr.

6423. Is it one of your grounds of objection to the Bill that it is not wide enough, and that it does not deal with the question of fish passes at all?—Certainly, if that is the meaning of the objection. The Bill is simply a Bill dealing with gratings, and, of course, one of my objections to this Bill is common to any Bill of the same kind; namely, that if you are going to amend the Irish fishery laws, you ought to codify them, and amend them properly. There is no question that the laws

Mr. Seton-Karr—continued.

with regard to salmon fisheries are very defective in many respects, and I have tried to get this question of fish ladders (it is erroneous to call them fish passes) altered. I think it was in the Bill Mr. Macartney introduced for me. It is certainly in a Bill that Mr. Seton-Karr introduced into the House of Commons.

Chairman.

6424. This Bill does not affect fish ladders, but your observation is a good one, that if Irish salmon laws are dealt with at all it ought not to be done piece-meal, but that they should be codified!—Yes.

Mr. Tomlinson.

6425. In the early evidence a good deal turned on the question whether turbines caused the depletion of these rivers of salmon, and it was suggested there were many other causes, and, amongst others, the inefficiency of the law with regard to fish passes?—If you will pardon me, I think the way that arose was this; it was alleged then in addition to what you say that it was the fault of the boards of conservators in not putting in force provisions which they had already power to put into force.

Mr. Macartney.

6426. It was on Mr. McDermot's evidence we got on to the subject, I believe?—I believe it was so.

Mr. Seton-Karr.

6427. We have had evidence to the effect that, as a matter-of-fact, with regard to the creation of fish ladders, fishery owners apparently do not appear to have any remedy at all at law. What do you say as to that?—There is no remedy at all.

Mr. Tomlinson.

6428. We have had evidence on both sides. Can you add anything to it?—Shortly I can give you in two seconds what really is the law, I believe.

6429. It would be well to give the Committee your explanation?—Shortly, it is this: the only power I am aware of, given with regard to fish ladders, is under the Act 1842, Section 63. The 63rd section deals with it, and says: "In all dams or weirs now existing, or which shall be hereafter constructed, means shall be provided for the free migration of salmon and other fish," under that section you had the power to put in what they call a fish ladder. On the Liffey, a man called Kavanagh raised his dam by means of putting a board across on the top. He so prevented the salmon going up, and he was summoned before the Metropolitan Magistrates. That was in the year 1875. The question then arose as to whether he was liable to the penalty that was imposed by that section. A case was stated to the Court of Common Pleas in Ireland, it was heard before the present Lord Morris, who was then Chief Justice of the Common Pleas, and the Court decided that the penalties that were stated on the face of that section did not apply to the first and second portions of the section at all, that is, did not apply to the case of: "In all dams or weirs now existing, or

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Mr. Twiss—continued.

or which shall be hereafter constructed, means shall be provided for the free migration of salmon and other fish; and that there being no penalty applicable to it the only remedy was an indictment at Common Law. That was the decision in the case of *Kavanaugh v. Gloray* in 1876. So that what was virtually decided was this, that there was no summary remedy against a millowner who erected a weir since the year 1842 without putting in a proper fish ladder.

6430. Was this board considered by the court to be an additional board or dam?—A raising of the weir. The section not only says, making a new weir, but also mentions increasing the size of it.

Mr. Seton-Karr.

6431. Had it the effect of preventing the salmon going up?—It had the effect of preventing the salmon going up. To show you that that was further tried, Sir Thomas Brady, one of the inspectors of Irish fisheries, was not satisfied with the decision of the Court of Common Pleas, and in the County of Kerry, he issued a summons in his own name against a man called Laidford.

6432. Do you put it to the Committee that one of the great objections to this Bill, apart from its merits, is that it does not go far enough?—I do; I think it does not.

Chairman.

6433. We have had it fully in evidence, and know from the evidence which has been brought before us, that the erection of a weir which the fish cannot get over is destructive to the fishery?—Yes, and that it is out of the power of any private individual to remedy it.

Mr. Seton-Karr.

6434. Then to make this a good Bill, quite apart from the subject with which it does deal, it ought to deal with the question of fish ladders, ought it not?—Yes.

6435. I think you have some experience besides being a lawyer, have you not, as a fisherman in your district?—Yes, I have been an angler all my life.

6436. Have you practical knowledge of the conditions of fishing and things affecting it?—Yes, I have a considerable amount of knowledge with regard to the habits of salmon.

6437. We have been told that poaching is a very great reason for the decrease of salmon; what is your opinion about poaching?—Of course, with regard to the poaching of the salmon, I can only speak as a solicitor from the time I have been actively connected with the salmon fisheries, and that is, as I say, for about a period of 15 years. Speaking simply in that capacity there is no question of doubt that poaching has diminished within the last ten years.

6438. Have there been fewer cases reported?—There have been fewer cases reported, and there have been fewer cases brought to trial. Anyone who is acquainted at all with a salmon river understands that you cannot carry on poaching without its being known. You might have difficulty in bringing offences home to a particular person, but it is utterly impossible that poaching

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Mr. Seton-Karr—continued.

can be carried on without its being known, and there is a great deal less poaching. The reason I attribute it to is that the watching is much more efficient; in my experience the class of bailiff is a better class of man than he used to be.

Mr. Moesney.

6439. What Board are you speaking of?—I am speaking of the Foyle and its tributaries; the men are a much better class in my own knowledge, and I say the system of watching is better.

Mr. Seton-Karr.

6440. Is not there an inducement to the bailiffs to report every case?—There is, and they fully avail themselves of it.

6441. What is that?—They are entitled to a third of the penalty under the Salmon Fishery Laws, and they endeavour to earn that as well as ever they can; it is a very strong inducement to them.

6442. Then you do not think of late years that poaching is answerable for the increased diminution of salmon in the Foyle, do you?—In the Foyle?

6443. Yes, in the Foyle?—By no means. Beyond all doubt there has been less poaching the last ten years.

6444. With regard to the Bann, do you think the poaching has increased?—I cannot speak very positively with regard to the Bann, because my information is almost entirely derived from the bailiffs themselves; but as far as my information goes, it has not, and I think the Inspectors of Fisheries' Reports will bear me out in that.

6445. Do you think, as far as your information goes, that the offence of discharging flax water into the Bann and its tributaries has increased of late years, or not?—From my information it has not. Sometimes it is a little more, and sometimes a little less; but, on the whole, positively, I can speak with regard to the Foyle, that there is not certainly so much flax water discharged as there used to be. I do not think it is on the increase; whether it is that they store the water up, or there is less flax grown, I do not know; but there is certainly not so much discharged into the Foyle as there used to be.

6446. Do you think it is possible that smolts or fry would ascend a mill-race of ordinary length after they had come gone down it?—Do you mean speaking as a fisherman?

6447. Yes?—I think that the Committee have not understood the question of fry and smolts. Mr. Webb may be perfectly right, and I think is perfectly right with regard to the fact that he says he has seen fry swimming about in front of his turbine and not going into it. That is very likely, because you will see fry in thousands. I have seen millions of fry in large quantities in the rivers floating about and swimming about and playing about; but there is a very great difference between a fry and a smolt. What I say is this, that you cannot compare the action of fry with the action of smolts, and what I want to impress on the Committee is this. The very moment a fry puts on a silver coat and becomes a smolt he is totally changed in all his habits from an ordinary fry.

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Mr. Macartney.

6446. It was agreed by the Committee that in using the word fry it should apply to smolts, and that all the witnesses who spoke of fry meant smolts?—

Mr. Seton-Karr.

6449. When they become smolts, do you think it is possible they can reascend?—I think it is perfectly contrary to their instincts. What I want to impress on the Committee is this, that a fry will swim about and keep about in the same place, and go up and down as I have seen them do. If you are a fisherman you cannot have failed to have seen it repeatedly; but the moment that fry becomes a smolt away he goes down the river.

6450. And when he goes down a mill-race of, say, 400 yards, or any ordinary length, as a smolt, do you think it is practically impossible for him to go back again?—In my opinion that is so. He would not go back; he will try to go down the river as hard as he can, and from my experience and what I have seen of experiments made, if you fasten up those smolts with their silver coats on, they will not live for more than about six weeks unless they get down to the sea. Whatever is the cause (I do not know what it is) they will not live in the fresh water; they must get to the sea, and they go in the fastest way they can; they go down the river till foremost and make their way to the sea as fast as they can.

6451. Do you know anything about the circumstances under which the agitation against the present existing law in respect of gratings or fry guards arose?—It is common property how the whole thing arose. The turbines sprang up in the Bann and its tributaries, and became much more common than they were before, and when the law was sought to be enforced against the millowners by the conservators of the Colvaine district, some of the different millowners kicked against it and they have apparently fought the matter out. They were brought up and summoned and fined, and as far as I know the agitation seems to be entirely confined to some six or seven millowners on the river Main. That is as far as my knowledge goes.

6452. That is a tributary of the Bann, is it not?—That is a tributary of the Bann where the law has been enforced. For example I would point out to you that of the seven gentlemen who were examined here in support of the Bill, six reside in the neighbourhood of the river Main, all having their mills there or flourmills, and the only gentleman who was produced to show any cause of complaint in the rest of Ireland was Mr. Shackleton, who is a relation of Mr. Webb's.

6453. He is Mr. Webb's brother-in-law, I believe?—I am told so. It is not very material, but at any rate he is the only gentleman who is produced from any other part of Ireland.

6454. In other words the seven witnesses for the Bill are men who are chiefly interested in one locality of Ireland, are they not?—They are, and, I think, that four of those in their

Mr. Seton-Karr—continued.

examinations stated that they were fined for not putting up those gratings.

Mr. O'Neill.

6455. Do you know if the law has ever been attempted to be put in force in any other part of Ireland?—I cannot speak to that; I do not know.

Mr. Seton-Karr.

6456. But none of the other millers in any other part of Ireland appear to be the least interested in this Bill, so far as you can judge, do they?—Not as far as we can judge from this inquiry here.

6457. In no way, as far as you know, is there any general agitation in favour of this Bill?—There is not.

6458. I think you are prepared to tell the Committee the operation of the Scotch law as to gratings, are you not?—Yes, I am aware of the Scotch law with regard to gratings.

6459. We have had references to that in the evidence, and I think your opinion may be valuable. On whom is the expense of erecting gratings thrown by the existing Scotch law, as the millowner or the fishery owner?—The expense is thrown on the millowner. The Scotch law varies a little from the Irish law.

6460. Give us shortly in your own way the points of difference between the two?—I will tell you shortly what the Scotch law is. The Scotch law is under an Act of 1862, 25 & 26 Vic., c. 97, which was the first Act which dealt with the matter. In Section 6, Sub-section 4, of that Act, power was given to the Commissioners to make regulations as to mill dams. Then under the 16th Section power was given them to make bye-laws as to the matters that were contained in that 6th Section, Sub-section 6. That was subject, of course, to the Secretary of State's approval. Then a summary jurisdiction was given under the 26th Section. Those bye-laws under the 16th Section were required to be made before the 1st January 1864, and there was an Act in 1865 which extended the time by which those bye-laws might be made to the 1st January 1866. Then in the year 1864 there was another Act of Parliament which extended the time for making those bye-laws to the 1st January 1866. Then in the year 1868, the bye-law which had been made in regard to gratings was embodied in what they call Schedule G. of the Act, and that bye-law G. is the law which is really in force now in Scotland with regard to gratings.

Mr. Macartney.

6461. Is that 31 and 32 Victoria?—That is 31 and 32 Victoria, Chapter 103. The words of Section 6 of the Act of 25 and 26 Victoria, Chapter 97, which gave the powers, are as follows: It enacts "That the Commissioners shall have power to make general regulations with respect to the following matters, namely, the construction and alteration of mill dams, or leats, or water wheels, so as to afford a reasonable means for the passage of salmon." Then the bye-law, as I say, is Schedule G. It

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Mr. Macarty—continued.

was determined as to who should bear the cost and expense in the case of Kennedy v. Murray before the Court of Session in the year 1869. There were seven judges who sat in that case, and it was held that those byelaws were binding, that they were regulations within the sense of this Act, and that these different gradings should be carried out and put up at the expense of the millowner. The judgment of the court was delivered on the 8th July 1869.

Mr. Tindleson.

6462. Was that on the byelaw which had been incorporated in the law of 1888?—Yes, quite so.

6463. Is the Scotch law considered satisfactory?—The Scotch law is not considered satisfactory, and the reason the Scotch law apparently is not considered satisfactory is because it is not the same as the Irish law. I would refer the Committee to the report. You are aware that under 45 and 46 Victoria, Chapter 78, which is the Scotch Act passed in the year 1862, there were fishery boards established, and an inspector appointed, and one of the inspectors of fisheries who was then appointed was a Mr. Archibald Young. In his report, which is the first report of the Fishery Board for Scotland, on page 46 he states: "Another point of some importance is to have a provision in any future Act in addition to the placing of locks" (which are the same as our grading) "at the intake and tail-lades of all mills as provided for by the existing byelaw for likewise placing guards of fine wire net-work at the entrance to intake lades during the period when smolts are descending to the sea. At present there is no statutory obligation on mill-owners thus to guard the intake lades of their mills; and the consequence is that numbers of smolts are annually destroyed on their way to the sea. As an illustration of this I may mention that in 1870 Mr. Buckland and I inspected a bleach work on the river Allan above Dunblane, where there was a turbine wheel at the time when the smolts were migrating to the sea, and we found the bottom of the pool below the bleachworks literally covered with dead smolts killed and smashed by the turbine wheel, the back at the intake lade with vertical bars two inches apart in terms of the byelaw being quite insufficient to prevent the smolts from being swept into the turbine. Diagrams illustrating the construction and use of such smolt-guards will be found in Appendix No. 10 to the report of the Select Committee appointed to inquire into the present state of the laws affecting the salmon fisheries of England and Wales, printed in 1870. Clause 30 of the 'Salmon Fisheries (Ireland) Act, 1863' (that is our turbine clause) provides"—Then follows in precise words the turbine clause.

Chairman.

6464. What reports is this?—That is the report made to Parliament by Mr. Young, who was appointed under the Scotch Fisheries Act of 1862. As further evidence that it was desired by the Scotch authorities to amend the law so as to make it conformable to the Irish law, I beg to

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Chairman—continued.

refer you to a Bill which was introduced by Lord Kintyre, the Marquess of Lothian in 1888.

Mr. Tindleson.

6465. Would that be a Government Bill?—I take it that it would be a Government Bill. In Section 46 they seek to have enacted in exactly the same terms the turbine clause that is at present in force in Ireland.

Mr. Macarty.

6466. Was it read a second time?—I do not know, I could not say. All I know is that it was introduced, and was ordered to be printed on 20th December 1888. I refer to it for the purpose of showing that from the terms in which the 46th section is set out, it exactly follows the Irish law on the subject, and that is therefore *prima facie* good evidence that the Scotch thought it desirable to have their law altered.

6467. Who thought it desirable?—The Scotch authorities thought it desirable to have the law altered so as to bring it into conformity with the Irish Act.

Mr. Tindleson.

6468. That would include the turbine clause would it?—That is the turbine clause in identical terms with the Irish turbine clause. I have compared them, and found it to be so.

6469. Is it your view that the Scotch Commissioners had power to make bye-laws with respect to lattices?—I believe they had originally.

6470. What became of those powers?—You see the powers that they had to make bye-laws only existed for a limited period of time, that is, to the 1st January 1864, then it was extended to 1865, and then to 1866. There is no question of doubt, I think, if anyone reads the Act of Parliament, which gives them powers to make those bye-laws, that they are equally applicable to making bye-laws as to lattice work as they would be with regard to grating or locks. I assume the reason they did not make them was because they did not find them necessary at the time; probably, as in Ireland turbines were not generally used at that time.

6471. Do you say turbines were not generally used in Ireland in 1865?—I do not say they were not used; they may have been used, but they were not generally used, they had not come into general use in Ireland. They have been introduced, according to my knowledge, principally within the last 15 years.

Mr. Seton-Karr.

6472. I believe Mr. Webb himself raised the point as to fish passes in his evidence. I am under the impression that he stated that if the weirs were supplied with passes there would be no necessity to protect the turbines, and you, I believe, were going on to tell us exactly what happened in this particular case where an indictment was brought?—Yes, I was carrying the thing to a conclusion.

6473. It is only fair that the point should be brought out in reference to the evidence given by Mr. Webb; will you complete your statement?

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Mr. Selous-Kerr—continued.

ment?—I referred to the case of Kavanagh v. Glorney as deciding the point. I told you that Sir Thomas Brady, who was one of the Inspectors of Fisheries, was not satisfied with the Court of Common Pleas' decision, and that in the county of Kerry he brought a summons in his own name against a gentleman called Latchford, who had raised his weir. That summons was heard; it was transferred into the Court of Queen's Bench after conviction, I believe (I am not quite certain about that, but it does not matter). The decision of the Court of Common Pleas in the case of Kavanagh v. Glorney was upheld, and it was held that the only remedy under that section was by indictment. That is two cases; therefore, the result was that Sir Thomas Brady called on the authorities in Ireland to indict Mr. Latchford for this offence, and a Bill was sent up to the Kerry grand jury, but it was thrown out.

6474. Therefore the only remedy they were advised they had utterly failed, did it?—Yes.

Mr. Macartney.

6475. Probably there was no evidence; a grand jury presumably find a true Bill on evidence, do they not?—Presumably they do. All I can tell you is what happened.

6476. You are not satisfied, I understand, with the Scotch law as it exists at the present moment?—I am not interested in Scotland, but I think it should not satisfy the Scotch people.

6477. Would you be satisfied to see the Irish Fishery Laws assimilated with regard to gratings to the Scotch law, would that satisfy you?—Certainly not.

6478. And, of course, you are not satisfied with the English law?—No; certainly not.

6479. You gave some evidence with regard to the Act of 1863, the Turbine Clause Act, did you not?—Yes.

6480. I understood you to say that that Act was passed after being referred to a Select Committee?—As I understand it, it was so.

6481. You are under a misapprehension there. There was an Act, which was a totally different Act, introduced in 1862 by Mr. McMahon, Mr. Brady, and Mr. Sullivan, and that Act was referred to a Select Committee?—

6482. There was no turbine clause in the Act when it was introduced into the House?—

6483. I do not know whether you are aware that the preamble of the Act was to assimilate the law of Ireland as to sea, coast, and inland fisheries to that of England?—

6484. A Committee reported to the House in 1863, after hearing the only evidence which ever has been before the House with regard to turbines; they did not insert a turbine clause in that Bill. Then in 1863 a Bill was introduced by the Government, which is the Bill which afterwards became an Act, and that Bill did not contain a turbine clause, so that apparently the Government, having considered the report of the Committee of 1863, did not, as far as they were concerned, think it necessary to introduce a turbine clause, but the turbine clause was inserted without debate in the House of Commons.

Mr. Macartney—continued.

That was the history of that clause, was it not?—All that I am not aware of; of course I am not criticising what you say, which may be perfectly correct.

6485. You are under a misapprehension about the Bill; it was never referred to a Select Committee?—All I know is that in the year 1862 there was a Select Committee which sat, and that, succeeding on the evidence given before that Select Committee, there is an Act of Parliament in 1863 with a turbine clause in it, and that Sir Thomas Brady was examined in the year 1863. He then gave evidence with respect to, if I recollect rightly, the destruction of fry at the Cork Water Works.

6486. Quite so, but the Irish Government, when they introduced the Bill, had no turbine clause in it, had they?—I have stated what I meant to convey when I mentioned it.

6487. I thought you had mixed the two Bills up together. Is your opinion of the turbine clause this; that it cannot be put into force until injury is proved?—That is so.

6488. What is the practice of the Conservancy Board. For instance, what has taken place?—I do not quite follow you.

6489. Long before any injury was proved, the millowners, we have it in evidence, were called upon to put up these fry guards?—Yes, certainly, they were.

6490. But no injury had been proved, had it?—That is not the question. You want to know how the procedure starts; I will tell you. It is not likely that the millowners and the conservators would agree on the question as to whether injury was caused or not. Very well; the report comes in to the conservators that there is a turbine erected, say, at Mr. Webb's mill, and that it is doing injury to the fry. Thereupon the conservators call on Mr. Webb to take efficient means, under the terms of the Act, for the purpose of preventing an injury which they say he does.

6491. But I want to point out to you that they allege he does it, but that it has not been proved?—You asked me what the procedure is, and I was going on to tell you.

6492. I know the procedure, but I want to know at what point the injury is proved?—It is proved when the millowner declines to comply with the terms of the Act of Parliament, and a summons is issued against him and he goes before the magistrates. Then when he arrives before the magistrates, who is the tribunal to decide the question, the case is thrown on the complainant to show that an injury has been done, and until he shows that this turbine may be injurious to salmon or the young of salmon in their descent to the sea, there is no obligation on the millowner to take any efficient means or any other means.

6493. If he does produce evidence there which satisfies the bench, then the millowner is obliged to put up a fry guard, is he?—He is obliged to provide gratings or other efficient means; he is not obliged to put up my fry guard.

6494. But, as a matter of fact, the Conservancy Board of Coleraine did call upon them to put up fry guards, did they not?—The Conservancy Board of Coleraine have no power to do so.

6495. Do

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Mr. Macartney—continued.

6495. Do you mean to say the words "other efficient means" would not cover fry guards?—Yes.

6496. What do you mean by a fry guard, a thing to prevent a fry going through, or some specific thing in your own brain?—I will answer one question first. "Fry guard" may not cover "efficient means," but "efficient means" may cover "fry guards."

6497. That I can quite conceive, but what in your opinion is a fry guard?—I can give you the varieties of fry guards. Of course, if you ask me what I consider the best fry guard, I think the best is what is called a submerged trough. A fry guard might be a most efficient means at one mill, and a most deficient means at another mill, because it might be a great hardship to a miller at one mill, and might not have the slightest effect on another mill.

6498. Do you say everything that prevents smolts going through would not be a fry guard?—Of course it would be a fry guard; anything that will prevent a fry going through will be a fry guard; but there is nothing in the Act of Parliament as far as turbines are concerned that requires any fry guard to be put up. It is "a grating or other efficient means," and it is open entirely to the millowner to elect those means himself.

6499. You do not suppose any Conservancy Board would be satisfied with efficient means which allowed smolts to go through, do you?—Certainly not, because that would not be "efficient means."

6500. In Mr. Webb's case, at Randalstown, the bench of magistrates were satisfied with evidence with which afterwards the Recorder was not satisfied; is not that so?—As far as I know, I think not; I do not think that is the real way the thing worked; I think it was a question of evidence. It was simply this, the Recorder had more directed to his mind what you know perfectly well a bench of magistrates has not usually, that is the question of law. The Recorder looked at it as a lawyer, and the bench of magistrates looked at it in a sort of common sense way. The Recorder, when his attention was drawn to it, thought that one of the essential conditions was that the complainant must have the onus of proof on him of showing the injury that was caused; and it was not satisfactorily brought to the Recorder's mind that there was sufficient injury, at any rate, done by Mr. Webb's turbine to justify him putting the section of the Act in force against him.

6501. What do you mean by sufficient injury?—What I mean by sufficient injury is this, that the Recorder seemed to think that the fact of seeing one small fry or two small fry, which appears to be all that Mr. Moles saw, was not sufficient evidence to show that that turbine was injurious to the salmon and the young of salmon descending to the sea at the particular time that the summons dealt with. That is my reading of the matter. I do not think the magistrates were biased in any way.

6502. But they were satisfied, were they not?—I think they were generally satisfied that there ought to be a fry guard, and that the fry guard
6500.

Mr. Macartney—continued.

was not there; that there ought to be some protection, and that there was not any.

6503. Do you think a bench of magistrates a satisfactory tribunal to go before?—To decide these questions?

6504. Yes?—I must say I do not. I am quite prepared, if the Comtee desire before they rise, to put such amendments before it as regards this Bill as I think would make it workable.

6505. I want to ask you a question or two on the Bill; as far as I understand your evidence, we quite agree what the effect of the Bill up to the third section is; up to the year 1869 there was no legislation affecting the placing of gratings in any water taken into mills, with the exception of the turbine grating, was there?—Quite so.

6506. And that in 1869 the introduction of the 4th section put in force the provisions of the Act of 1842, and at the same time gave the power of exemption to the fishery inspectors; now, as to Clause 4 of my Bill, I think you said you had several objections; are your objections simply objections as to drafting, or that the clause is not operative?—My principle objection is not to its being badly drafted; I say it is very ambiguous.

6507. Supposing the ambiguity was taken out of it; for instance, your first objection was to the words "May order"?—Yes.

6508. If the ambiguity attaching to these words was removed, and the words "May cause to be placed" were inserted, would you withdraw your objection so far?—Certainly not, because all my objections still remain most actively in force; I say there are no powers.

6509. You said there was an ambiguity as to where these things were to be erected in the river; do you say "At or near the point of divergence" is ambiguous?—No, but I say "Or in any other suitable place" is ambiguous; who is to decide where that other suitable place shall be.

6510. Do you say there is any doubt there as to who shall decide?—Beyond all question.

6511. Would that objection be removed if words were placed in the clause defining the position accurately?—If that was made to read, "It shall be in any other suitable place to be determined by the board of conservators," for instance, it would make it perfectly clear.

6512. And then your objection would be waived, would it?—The ambiguity would be removed; that is all.

6513. The ambiguity would exist in your mind in the interpretation of this clause, would it?—The ambiguity that exists in my mind would then be removed, as I think it would be in anybody else's mind.

6514. Then taking the words, "A grating of such form and dimensions as they shall determine;" is there any ambiguity there?—The only question is who you refer to by "they."

6515. Do you not see anybody in the clause to whom it would refer?—I think it would be preferable to make it more distinct. I should suggest "as the board of conservators may determine."

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6516. Would

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Mr. MUNN.

[Continued.]

Mr. Macartney—continued.

6516. Would that remove your objection?—It removes the ambiguity.

6517. Then you raise an objection to the proviso, do you not?—Yes.

6518. You said it was superfluous?—I think it is, and I think it is misleading.

6519. It was not intended to be misleading. I quite agree that if the clause of the Act of 1842 had applied only to water taken up for the purpose of machinery, it might not have been necessary to put in the proviso, but you are aware, are you not, that sometimes when people are drafting, they are a little over careful, and that whereas the Act of 1842 does apply to other waters, it possibly might be surplusage here?—Quite so, but I think that a person who did not look at it very critically might be misled into assuming that it was giving some power, which it does not give at all.

6520. That might occur with regard to any Act of Parliament, might it not?—It might.

6521. Especially when you are dealing with a whole series of Acts. You had another objection to this clause that there were no powers given to the boards of conservators to carry it out. There is no power to boards of conservators now in Ireland to enter, is there?—They have no power to enter on any land of any description.

6522. None at all?—Not that I am aware of.

6523. For any purposes whatever?—Not that I am aware of.

6524. Then do you think they ought to have that power conferred on them?—If this Bill is to be made an Act, and the intention is that it is to be carried out, then you must give them power.

6525. Then would you draft a clause which would in your mind be satisfactory and give satisfactory powers?—Yes.

6526. Would you be good enough to draft a clause and let the Committee have it?—Of course it can be done, but you would have to go into questions of bringing in arbitrators, taking land for the purpose, compensating the owners from whom you took that land, powers to take those lands compulsorily, and you would have a paraphernalia and procedure which would swamp the whole concern.

6527. Swamp what?—The cost and expense of putting up of one grating would be more than the cost of the whole grating itself.

6528. I merely ask you if it can be done?—Yes, it can be done.

6529. Are you prepared to draft a clause that would satisfy the conservancy boards?—Do you mean for the purpose of satisfying the conservancy boards with this Act?

6530. No, for the purpose of carrying out the powers of Clause 4 of this Bill?—I certainly could do it.

6531. Supposing there was such a clause, would that withdraw your objection to Clause 4?—No, it would not.

6532. Then do I understand that nothing will meet your objections; even if the promoters of this Bill met your objections on all these points, still would you object to Clause 4?—Yes, and I will tell you why. The reason I object to it is on principle, I say you are legislating backwards.

Mr. Macartney—continued.

I say you are imposing an obligation on a board of conservators which they have no right to take, that is what I say. I say you are putting the expense on them of taking these precautions to prevent the destruction of fry which the person who really causes the necessity should bear.

6533. You are assuming the destruction of fry, are you?—I am assuming the destruction of fry.

6534. At the present moment is it not a fact that the only case which has come before judicial cognizance has resulted in a decision by the Recorder of County Antrim, that the destruction of fry was not proved to his satisfaction?—That may be; that is one particular instance.

6535. It was the case, was it not?—That is one particular instance, but there may be other instances.

6536. Are there any cases in which your conservancy board or any other board in Ireland, to your knowledge, have attempted to enforce the law?—It has been enforced on the river Maun, in other places.

6537. Where, can you point out to me any mill where you are attempting to keep up your fry guards?—At the present moment I cannot say, because I believe they have all taken them down, but as I understand on the river Maun, there were a considerable number of fry guards put up. For instance, at Mr. Geban's mill there is a submerged trough working at the present time.

6538. That is admitted, but the evidence before the Committee is, that it is a McAdam turbine, and it is absolutely necessary where you have a McAdam turbine, to put up a submerged trough. He would do that independently of fry altogether, would he not?—And a turbine owner will put up a grating in any case for his own protection.

6539. Can you point out to the Committee any other case, with the exception of Mr. Webb's, where you have attempted to put the law in force?—I am sure I could if I had an opportunity of going into it.

6540. The evidence at present is, that the protections they have been called upon to put up have only been kept in temporarily while the water bailiffs have been going round, and the moment they are out of sight they are taken up, and practically they have not been kept down?—That may be, but surely the fact of putting it up is an admission of the necessity at any rate.

6541. We will not argue the point?—It is right that in my answer I should be understood, because otherwise I should say, if they were not satisfied with the legal obligation of putting it up, and that they were not doing an injury, they would have allowed themselves to have been brought into court, and tested the question like Mr. Webb.

6542. Are you prepared to agree to half the cost of these erections being placed on the fishery owners?—Now you are asking me, in the position of a solicitor, to decide what a fishery owner would do; I think it would be the most injudicious thing to do, because it would be admitting to half the extent the principle, to admit which I say is entirely legislating

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Mr. MUNN.

[Continued.]

Mr. Macartney—continued.

legislating backwards. What I say is, that the person who causes the injury is bound to take the necessary means, whatever they may be, to prevent that injury, I say it is contrary to principle, and I say if you are to uphold that principle, and act on that principle, you could not consent to pay any part, because if that is done to-day there is nothing to prevent further legislation next year, and the principle once admitted is then used against you.

6543. How do you reconcile your theory with regard to turbines, and the actual state of the law with regard to dams and weirs now?—I do not quite follow you.

6544. I understand from you that you have not sufficient authority over dams and weirs?—I do not say we have not sufficient authority, what I say is we have not sufficient facilities under the Statute Law to enforce the law; that is all I say. I say that the law requires necessary amendment, just in the same way that I think in the discharge of flax-water it requires to be amended.

6545. How would you amend the law with regard to the discharge of flax-water?—It is travelling outside the enquiry, but I have mentioned that matter, and I will tell you I think it is very difficult to enforce the law with regard to flax-water, because it says, you must prove that you have seen a man cutting into the dam that runs the water out.

6546. Is it your experience that magistrates will not enforce the law in flax-growing counties?—They will not if they can avoid it.

6547. It is practically a dead letter, is it?—It is in this way; they will not impose any substantial penalty. They did to some extent put their faces against it.

6548. The tributaries of the Main all rise in large flax-growing counties, do they not?—I believe they do.

6549. Consequently they would be very subject to carrying down into the Main a very large quantity of flax-water, would they not?—I cannot say anything from my own experience about that. I believe flax-water comes into all those rivers, but I believe there is a great deal less than there used to be; I am perfectly certain there is not more. I think the elements that were destructive of fish have been in existence considerably more than 15 years, but I know this, that poaching is not worse in the last 15 years.

Mr. O'Neill.

6550. You say you think there is not so much flax-water going down in the rivers. We know from statistics that there is more flax grown. How do you account for that?—That may be, but I speak with regard to the Foyle and its tributaries, and I do not think there is anything like as much flax-water discharged into that river as there used to be, certainly, within the last six or seven or eight years. There used to be more flax-water coming down than there is now. We try and induce them to put it into ponds.

6551. Are they allowed by law to let it off into the rivers in flood?—They are not.

6552. At any time?—At any time; but we endeavour to meet them in every way we can.

Q.80.

Mr. O'Neill—continued.

If there was a large flood and flax-water had been lying some time, we would perhaps let them let it away at that time; but now they are becoming more inclined to throw it over the lands as manure.

Mr. Macartney.

6553. Mr. James Paterson, who came here to interpret the Acts of Parliament for the advantage of the Committee, told us that he thought the state of the law in Ireland was anomalous in fact; that inspectors of fisheries had power to grant exemptions with regard to gratings at head and tail races, and had no power to grant exemption with regard to turbines?—

6554. And that in his opinion he thought it would be a reasonable amendment of the law to give them power with regard to turbines?—

6555. Do you agree with him in that?—It altogether depends. It is to be looked at in this way. The 76th section refers more to bucket wheels and that class of wheel.

6556. There is no mention of bucket wheel in it, is there?—No, but I say it actually does.

6557. I want to call your attention to the fact that an attempt was made to enforce the 76th section in all these mills on the Maia, where they are all turbine wheels. There is nothing to exclude it being applied to turbines, is there?—No; but what I mean is this: where a mill is actually worked by a turbine it is a more destructive engine than the old bucket wheel was. That is all I say, and if you give the inspectors this power with regard to turbines, you are giving them a power to grant an exemption in the case of an instrument which, according to my point of view, is of necessity perfectly destructive to salmon fry. Now, I say in the other case you should only give them a power of exemption with regard to a wheel, which is not of necessity so destructive at all.

6558. But it would apply to the head race of a turbine wheel as much as it would to any other, would it not?—It would; but supposing, for instance, you take Mr. Webb's Mill, which is worked by a turbine. Mr. Webb does put, or is called upon to put, up a grating and lattice under the 76th section at the point of divergency from and return to the river of his mill course. The inspectors of Irish fisheries give him an exemption (as they actually did), and the consequence is, he sweeps away his gratings and his lattice works; but still he is under an obligation under the 30th section of the Act of 1863 to take efficient means to protect his turbine; now, what I say is this; if you give them the power to do away with that efficient means, that is the turbine section, then you throw the whole thing open to certain destruction, from my point of view. In the other case, if it was simply a question of being worked by a bucket wheel, you would not be doing so; because, for instance, fry would receive no injury from a bucket wheel, which, from my point of view, they are certain to do from a turbine.

6559. The inspectors of fisheries, presumably, had satisfied themselves that if these gratings were put up at the head race, they would so injure Mr. Webb's water power, that they would

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Mr. MUNN.

[Continued.]

Mr. Macartney—continued.

stop his works, and therefore they gave him an exemption?—That may be.

6560. You do not suggest that the inspectors of fisheries in Ireland would idly give such exemptions, do you?—No; and I think I follow what you mean, which is this; assuming a case where it admittedly is the fact that a turbine is not injurious to the fry, and in which an exemption would be given, is it reasonable they should be compelled compulsorily to keep up these efficient means; is that your case?

6561. Yes; my point is this, that under the 76th section the lattices which might be enforced in addition to the gratings could be an efficient protection from fry entering a mill race, and against that the inspectors of fisheries in Ireland have power to grant exemption?—Quite so.

6562. But though they are satisfied they ought to grant an exemption against those gratings and lattices, the Act of 1863 comes in and practically nullifies that exemption, while practically insisting on efficient means being put up somewhere else?—That is exactly where you and I are at issue. I say the Act of 1863 does nothing of the kind. What I want to make clear is this; under the Act of 1842, coupled with the Act of 1863—

6563. The Act of 1863 is independent of the other two Acts altogether?—The other two Acts must be read together, you will admit?—Yes.

6564. What I say is this; that under that there is a power of exemption given, and I say that meets that case exactly, and what I say is that the wording of the Act of 1863 does as much for the mill-owner under that 30th Section as an exemption does for the mill-owner in respect of the 76th Section.

6565. No; not until he goes to law?—Exactly; but that is the point; he does not go to law.

6566. But he can go to the inspectors of fisheries without taking any legal steps whatever, and if he satisfies them they give him exemption, do they not?—Yes.

6567. And according to your reading of the turbine clause he cannot get an exemption, and he is obliged to defend himself in a court of law?—Exactly; he is summoned before the magistrates, and unless a satisfactory case can be made out against him he is under no obligation to put up efficient means.

6568. Would you be prepared to agree to an amendment of the law such as was indicated by Mr. Paterson as reasonable, that is, that power of exemption should attach to the turbine as well as to the other?—I am not prepared to say I would not.

6569. Do you think the condition of affairs at the present moment is a satisfactory condition?—I think the condition of affairs is most un-

Mr. Macartney—continued.

satisfactory. Of course, I am stating my own opinion alone. You are not going to bind the fishery owners by me, but I would amend the law.

Mr. TOWNSEND.

6570. Your experience is chiefly in the Foyle. I understand?—My experience is chiefly in the Foyle, as solicitor for the Board of Conservators.

6571. Is it your view that salmon have diminished in the Foyle?—My experience is that they have not diminished in the Foyle.

Mr. O'NEIL.

6572. You said there was great difference between fish ladders and fish passes, I understand?—There is.

6573. Is there any legal distinction between them?—Yes; speaking from a legal point of view, there is.

6574. Will you kindly tell the Committee what it is?—Fish ladders are erections placed on the outside of the weirs which are erected in rivers for the purpose of damming back water for mills. Fish passes are passes that are put into fishing weirs for the purpose of allowing a certain number of salmon at any rate to pass up for the purpose of breeding; they are what are called Queen's gaps. There is an express distinction between the two things, and it is wrong to confuse them by calling them passes when you mean ladders. It has reference simply to that 63rd Section. I mean to say it is wrong to call the passage which is referred to in the 63rd Section a fish pass, because you are not entitled to make a cut down to the bed of the river through a mill-weir belonging to a miller, whereas under the Act of 1863 you were expressly empowered to make Queen's gaps without any compensation whatever through fishing weirs.

6575. Is there that same legal difficulty in putting up a Queen's gap as there is in putting up a ladder?—You have no power to put a Queen's gap except in fishing weirs; you cannot put a Queen's gap into a mill-dam.

Chairman.

6576. Are there any turbines on the Foyle?—I think within about the last year there have been two put up. One I am sure about.

6577. What part of the Foyle is that?—One is in the Faughan river, which runs out at a place called Calmore, about four miles seaward of Londonderry.

6578. Is that a fish breeding river?—Yes, it is; but it was put up so recently that we have only had our attention called to it a short time ago.

Friday, 20th May 1892.

MEMBERS PRESENT :

Mr. Cox.
Sir John Whittaker Ellis, Bart.
Mr. Hayden.
Mr. Hosier.

Mr. Macartney.
Mr. Pinkerton.
Mr. Seton-Karr.
Mr. Tomlinson.

SIR JOHN WHITTAKER ELLIS, BART., IN THE CHAIR.

MR. JAMES PERRY, called in ; and Examined.

Mr. Pinkerton.

Mr. Pinkerton—continued.

6579. You are County Surveyor of Galway I believe?—Yes.

6580. Are you a master in engineering of the Royal University?—I am.

6581. What opportunities have you had for studying hydraulics?—I studied hydraulics under the late Professor James Thomson, who was the inventor of turbines and pumps, and who I think is recognised, or was recognised until his death about a week ago, as probably the first hydraulic authority in the three Kingdoms. He was brother to Lord Kelvin.

6582. Do you understand the different kinds of turbines in use?—I do. I have had active hydraulic experience for the last 18 years.

6583. Are the open set turbines in your opinion dangerous to salmon fry?—I, for the purposes of the inquiry in regard to the danger to fish in passing through turbines, would be inclined to divide turbines into three classes, independently of the great number of names we have applying to turbines. As to the ordinary so called reaction turbine or Barkers Mill, which is a mere tube, I should say if properly constructed having regard to the speed and fall and all that, that anything that will pass through it will pass through it safely. Then there are turbines with guides and vanes, those turbines that are close set, that is with the edges of the guides coming pretty close to the edges of the vanes, I would expect them to be dangerous to fish if fish passed through them, but I have made no practical experiment in connection with a turbine of that kind, and I would say that a practical experiment would be better than any amount of theory with regard to them.

6584. Is the turbine in your opinion more valuable as a motor than the ordinary bucket wheel?—Certainly, I can hardly imagine any circumstances under which a bucket wheel would be better than a turbine. The points in favour of the turbine are very many and of very great importance. It is no argument whatever that a bucket wheel can be made as efficient as a turbine. A bucket wheel may be made as efficient as ever you please. It is a mere question of expense and size. If you drive a
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bucket wheel sufficiently slow and have it sufficiently large you can make it as near an efficiency of 100 per cent. as ever you please. But then you have to get up the speed and then there is the loss of energy in the gearing in getting up the speed. That in addition to the enormous dimensions which you have to go to if you want to give high efficiency means a very great expense. With a turbine you get up your speed to the proper amount at once, the whole thing is compact and comparatively simple and cheap.

6585. You were associated with your brother Professor Perry and Mr. Pearce in the Galway Electric Company, I believe, for the purpose of lighting Galway?—Yes, we are three engineers.

6586. What sort of turbine do you use?—We use the turbine which is called the "Hercules."

6587. Have you carried out any experiment there?—Yes, I have carried out some experiments.

6588. Will you kindly explain to the Committee what the nature of the experiment was?—Almost our first experiment was an involuntary one. Mr. Pearce, who is my partner, and myself were working together at the turbine, the turbine was running and he happened to drop this rule out of his pocket and it passed perfectly safely through. There was not the slightest scratch or mark on the rule after passing through the turbine. I was present and saw it.

Mr. Tomlinson.

6589. Is that the Hercules Turbine?—Yes.

Mr. Pinkerton.

6590. Did you read the evidence about the fish being buried round and being killed by the impact?—Yes, I may say that I offered to the lessee of the Galway fishery to give him every possible facility for carrying out any experiment, and suggested that he should put a netting below our turbines and see if he could catch any damaged fry. An experiment was carried
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Mr. PERCY.

[Continued.]

Mr. Pinkerton—continued.

out in the presence of Mr. Hornsby and Sir Rowland Blennerhassett. After the experiment was over I met those two gentlemen in the office, and I was informed in the presence of those two gentlemen, I think, that they had put on a net at the tail of the turbine; that they had brought over a bucket of fry; that they had poured this bucket of fry through a wooden pipe or shoot down into the turbine, and that they had caught no injured fry of any kind below. I am quite sure that fry would not be injured in our turbine.

Mr. Tomlinson.

6591. Do you mean that they collected the fry alive after passing through the turbine?—No, I understand that they did not get any fry in the net at all. There was plenty of room for the fry to swim about. There was no reason whatever for the fry coming into the net unless they were so injured that they could not swim, but if they were so injured it was supposed they would come into the net.

6592. You passed that bottle through the turbine, I understand?—I saw that there was some evidence given as to the impact of the fish against the vane of the turbine. I have here the Centor lectures of my brother delivered in 1882, when this Bill was not thought of. He lays down here that the important thing in connection with the turbine is that there should be no impact. It is perfectly certain that if there is impact there is more or less loss of power. If you have impact you have eddies, and if you have eddies you have loss of energy. A great point in hydraulic machinery is to bring the water up and take it away as quietly as possible, and if there is anything in the nature of impact or eddies there is a loss of energy. Then any turbine in which there is impact would not be an efficient turbine. These turbines of ours we find to be very highly efficient, that is, they give a very large percentage of the power through them up to the machinery. The efficiency is measured either as a percentage of the power or as a decimal of one. If you call perfect efficiency one then the efficiency will be something less than one, and you may either put in that way or put it as a percentage. 7 of efficiency would be the same as 70 per cent., and 8 efficiency would be the same as 80 per cent. These turbines are highly efficient, and I knew from that that it was impossible there could be much impact. For the purpose of testing whether there was impact or not, I got three small bottles like this; I put a piece of paper into the bottles so that if a bottle happened to be broken, the paper would come out and we would know we had not missed it in the tail race. When I dropped the first bottle in, the gate was only opened five inches, the bottle had to pass through a hole five inches by two; the first bottle was broken. I probably have no right to theorise as to where the bottle was broken, but my opinion is that it was broken at the outside of these guide blades, because I am perfectly convinced in a theoretical way (I do not know how much weight the Committee will be disposed to give to my opinion) if anything gets through there in the Heronlee

Mr. Tomlinson—continued.

turbine it will go through all the rest of it. These guide blades are fixed and are of the nature of a grating in themselves.

Mr. Macartney.

6593. Do these things in this model represent the guide blades?—Yes. I put through a second bottle, and the second bottle was broken; I put through this third bottle and it came through safely; the bottle is about the same specific gravity as water. Just a little water was put in to make it come to the surface, so that we could catch it below. That was the second experiment I performed. You were not able to take my evidence on Tuesday, and I telegraphed to my partner to try passing some boiled eggs through the turbine. I may say that on Monday before coming here I tried a couple of raw eggs myself. A raw egg of course is a very easily broken thing, and the two raw eggs that I put through we did not get in the tail-race at all. But my partner telegraphs to me and says, "Of four boiled eggs one passed with whole shell, three cracked, found a Monday egg in tail cracked." That was a raw egg he found in the tail water, and he says "sending by post two eggs." I have a letter that he sent with the eggs and I take it from that letter that he sent the whole egg and one of the bruised ones, but unfortunately both eggs have come here broken. It was able to stand the turbine, but not the London and North-Western Railway. (The witness produced the two eggs). It is impossible to say how much of this bruising was due to the turbine and how much the railway company; but one of them he says was whole when it was sent to me. He says "Boiled four eggs six minutes, of which two were floated with cork attached with shellac." Into the raw eggs I put through on Monday I blew a little air and sealed up the hole so that they would float. "Head of water four feet," that is a low head, and the reason he put this low head on was so as to put the eggs in at the guide blades with safety, because my belief was that the eggs I put in were broken against the guide blades and not in the turbine at all. Of course the turbine is made to run with a head of nine feet and this head of four feet is not its usual head. I have to say with regard to that, that there is probably more risk to the eggs with a head different from its normal head of running than with a normal head; because with a normal head and the proper speed there should be no impact. But with a varying head you might expect some motion and impact because there is a waste of energy in the machine. A machine running with its normal head and at its proper speed there ought to be, with a high efficiency turbine, no impact whatever, and I believe there is none.

Mr. Sirten-Kerr.

6594. What do you mean by impact?—The strike of the water against the vane.

6595. I want to know impact between what?—Between the fish and the vane or between the water and the vane, I do not care what it is. We do not suppose that fish pass through there. Those who designed turbines never thought much of the fish.

6596. The

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MR. PERRY.

[Continued.]

Mr. Pinkerton.

6596. The impact I suppose is caused by a sort of eddy?—The impact is caused when one thing is moving at a different rate from another, and they come into contact. These vanes move at the same rate as the water comes from the guide blades, consequently the water in contact with the vanes ought not to impinge on the vanes at all; it is a crash. It delivers up its energy to the vane without impact. It is in this way; if I put my hand to the table and push, there is no impact, that is how it ought to be in a properly constructed turbine. There ought to be no impact. That is to say the fish will not suffer by striking an iron plate.

Mr. Macartney.

6597. You are using the word "vane" to describe these apertures which are sometimes called ports are you not?—Yes, that is so.

6598. The proper technical word is "vanes"?—Yes.

Mr. Tomlinson.

6599. By the guides do you mean the things inside?—Yes.

Mr. Pinkerton.

6600. You have a full size diagram there of your turbine, will you kindly show it to the Committee?—This is a drawing of the turbine as it appears from the outside; it is a general view of it.

Mr. Tomlinson.

6601. Is that full size?—No, that is 1½ inches to the foot. This is what is called the draught tube. These lines which you see here are the edges of these guide blades.

Mr. Seton-Karr.

6602. They are what have been called by other witnesses "guide vanes" I believe?—I do not know. These, as I understand, are vanes, and I call these guides. This is the draught tube. This part is simply the space into which the gate, that is the sluice, is lifted up. The sluice is lifted up by a pinion on this shaft that goes across here, and the two racks on which the pinions work rise up into these things that stand up. This is the shaft to which the machinery is attached, and this is the coupling. The turbine is supposed to be sliced across about the middle of what is called the disc. This turbine is of considerable height. I have a vertical section to a small scale in this book of Mr. Bodmer's, and you will probably understand it from this. This is a vertical section of the Hercules Turbine. I have pencilled in there somewhere where the edge of the gate comes, and the vanes or the guides are outside of this gate. The gate comes down and closes. These things actually scrape the gate as it comes down, or rather it comes down freely, but they are quite close. What I maintain is, in connection with this Hercules turbine, that any thing that passes there will pass through the rest of it. This is a 42 inch turbine, and that is about two inches.

Mr. Seton-Karr.

6603. What is the clearance?—It is about 4½ inches in the middle. The gate is here. I remember in taking the turbine from the railway 0.80.

Mr. Seton-Karr—continued.

station we had some little difficulty unless we took it carefully.

6604. What is the gate for?—For shutting off the water.

6605. When the thing is working is the gate up?—Yes.

6606. And in your turbine there is 4½ inches between the ends of the vanes and these guide blades as you call them?—Yes, except that in this section you will see it is a varying distance. It is more than 4½ inches in the middle and less down here.

6607. At the shortest point what is the distance?—It is about 2½ inches.

6608. And it goes up to how much, 4½ inches?—Four and a-half is the average, but it is more than 4½ inches up here.

6609. We have it in evidence that in an ordinary modern turbine there is only a clearance of about a quarter of an inch there. Therefore your turbine as I understand has a very much larger clearance?—Our turbine certainly has a very much larger clearance than some turbines I know; but I think it is better to give you a specific turbine than to try and describe all the turbines.

6610. Is this the turbine through which you put these glass bottles, these eggs, and so on?—Quite so. This is a specific turbine and I am telling you specific things about it.

6611. It has a larger clearance therefore than other turbines, as to which we have had evidence before this committee?—Yes, and it will have a larger clearance than the same character of turbine of a smaller size, but what I say is, that anything that passes through here, through the fixed guides, will pass through the whole of it, and that applies to all sizes of turbines.

6612. Where the clearance is as great as that?—No, I say that is with a turbine built after this plan. These guide blades are fixed. In all turbines made after this plan these guide blades are practically a grating, and anything that passes through there will pass through it altogether.

6613. Does it not matter about the size?—No.

6614. The size in a smaller turbine between these fixed blades varies in proportion to the size of the turbine does it not?—Certainly.

6615. Therefore in a smaller turbine they would be smaller?—Yes.

Mr. Cox.

6616. Supposing the fry were to pass through where would they go to?—I have sketched in a fry there. With this particular turbine (and I still give specific examples) the velocity of water about here is about 14 feet per second.

Mr. Seton-Karr.

6617. Is that with a four foot or nine foot head?—That is with a nine foot head.

6618. You made these experiments with a four foot head, did you not?—Yes.

6619. What was the velocity then?—I should have to calculate it.

6620. Is it in the same ratio?—No, it is not the same because a turbine is driven ordinarily at a rate that would give it a velocity of about half the velocity that would be due to the head, you get

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Mr. Seton-Karr—continued.

get the velocity to the head with a little formula, and you drive your turbine at half that velocity, but when we are running the turbine with that light load and letting it run free the velocity of the turbine may go up to the full velocity of the head, and with the four feet head I think we had pretty well the same velocity.

6621. Was that 14 feet per second?—Yes. I will show you what I mean. $\sqrt{2}$ g. h., that is 8 times 2, that would be 16. With a 4 foot head and water falling freely you would have a velocity of 16 feet per second, so that you could have with a four foot head the same velocity as if the turbine was running at its full velocity of nine feet.

6622. Where the turbine was doing no work do you mean?—Exactly, the turbine will run to as nearly as possible the velocity due to the head, but if you put on the work, when it is working most efficiently, it is working at about half that rate.

6623. Supposing the turbine had the same resistance and the same work to do, I suppose where you get a velocity of 14 feet here with the nine-foot head, you would only get a velocity of seven or eight feet with a four-foot head?—No. If you were working the turbine up to its full work, certainly, but that would be a more favourable condition for the fish. With the four-foot head, and the turbine running nearly free, the conditions are worse for the fish and these eggs than if it were running with a nine-foot head.

6624. That is rather an hypothesis, is it not?—No, it is not, because it is certain to this extent that if you are running a turbine free you are wasting your energy; if you waste it, you waste it in motion, and there is greater danger to either fish or eggs passing through.

Mr. Pielerton.

6625. I suppose this turbine of yours gives the same percentage of power as any other you know of?—I may tell you that this turbine was selected by my brother, who is a Fellow of the Royal Society, and who is the author of those Cantor lectures. He is professor of engineering in the Finsbury Technical College here, and he has a very high reputation. My partner, Mr. Pearce, is an engineer who served an apprenticeship to my brother, and is a man of very considerable ability; as to my own ability I do not want to say anything, but among the three of us, each of us criticising the others, I think we have produced as perfect an arrangement as one could expect.

6626. What size of fish could go with safety through that turbine of yours?—I believe a 1-lb. trout could go perfectly safely through that turbine.

6627. Do you object to putting up perforated plates or submerged troughs?—Our place is very peculiar. We have no control over our intake. The proposal here is to put up those perforated plates at the intake, but at Galway we have no control whatever of the intake. The objection appears to be that the Fishery Conservators could not do the thing, because they had not control. We have no control.

Mr. Pielerton—continued.

6628. Why have you no power at the intake?—Because the whole arrangement of the Galway water power was carried out by the Board of Works under a specific Act of Parliament, and the water is divided among a great number of mills. We have got our sluice openings, and we have got our sills fixed, and the intake is common to a great many mills, and we have no control over it at all. I want to go into the question of the iron plates. Mr. Bodmer said that the loss of water passing through an iron plate might amount to 10 per cent. Of course, he was speaking generally, but I want to take the specific case of our own mills. The iron perforated plate that has been proposed with holes of a certain size, I take it roughly, has an area of holes equal to the area of the solid part. I have made a little calculation here (will speaking specifically), if the water in the head-race is going at one foot per second, I assume that the area of the holes is about equal to the area of the solid part. Then there is what is known as the contracted vein. Now the contracted vein is no doubt a thing that varies with the way in which the holes are punched. If the holes are punched in a peculiar way like that (describing) the contracted vein will not be so much. But I take it as an opening in a sharp-edged flat plate; I take it in the ordinary loose way of taking a contracted vein, because it is a varying thing, and altogether depends on the shape of the hole. But a rough and ready way of taking a contracted vein is to take it as three is to five. If you take the contracted vein as three is to five, and if you take the area of the apertures as one-half of the total area of the plate, then, independently of any choking from weeds, or leaves, or anything of that sort, and suppose a perfectly clean plate, it would take three times the sectional area of the plate to pass the water at the rate of one foot per second.

6629. In other words you would require to widen your intake to that extent?—Yes. Then on either view of it, that is supposing you do not have any loss of head whatever, and supposing that you can do with a loss of head and keep the area the same as before, you would have a loss of head of about nine inches. If you consider nine inches in connection with nine feet it is roughly about what Mr. Bodmer put it, 10 per cent. But this throwing away of 10 per cent. of power is a very serious matter. Ten per cent. of money or anything is a very large thing. But with our Galway case it is vastly worse than that, because we simply get the water that passes over our sill and it is not nine inches off nine feet, it is nine inches off three feet. If you apply the law of quantity passing over a sill to that you have it that you only get about one third of the water with a loss of nine inches, because it varies in the five-half power of the height. That is if you raise it to the five-half power and extract the square root of it, and if you raise two feet two inches to the five-half power and extract the square root you get 7.5. If you raise three to the five-half power and extract the square root you get 15.7. That is, one is more than twice as much as the other. If in addition to that you deduct

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Mr. Finlerton—continued.

deduct the loss of head you only would get by putting on a perforated plate like that and keeping the area of the intake the same about one-third of the power which we do at present, which would be a very serious matter.

6630. Supposing you are willing to erect a perforated plate, have you power to widen your intake?—No, we have not.

6631. Have you a close time and are you compelled to shut your race on Sunday?—Yes, and that is a most important matter. If the water power of Ireland is to be properly developed it will be done electrically. Take the town of Galway. I estimate the water power of the town of Galway as worth 50,000 *l.* a year. That is taking Lord Kelvin's estimate of the value of horse power; Galway is comparable with the town of Geneva in Switzerland; there the magnificent water power of the river Rhone is used to pump water up to the hill and supplies all the small industries of Geneva with power; we propose to do the same thing in Galway. That is what we have commenced to do. We are doing electric lighting and we have one motor in the place now and we have orders for others.

6632. Supposing the Fishery Commissioners carry out their powers at the present moment, would it cripple your business in Galway?—Certainly it would. I may say the lessee and owner of the Galway Fishery have treated us very well.

6633. Explain how this Sunday closing business affects you?—In Galway, the weekly close time has been set up to meet the case of rivers where practically the whole of the water is taken for milling purposes through the week. We have a weekly close time. Each mill has got to shut down 24 hours between the hours of six o'clock on Saturday night and six o'clock on Sunday morning.

Mr. Seton-Karr.

6634. With what object?—With the object of allowing sufficient water in the river for fish to get up at least once a week. But there are rivers and rivers. There is this Galway river for instance where you have got a river over 100 yards wide, with water eight feet deep flowing to the sea uselessly, and yet you are expected to shut up a small mill in order to put a little more water into that. It is utterly absurd. Of course I was perfectly aware of this when I set up these electric works in Galway, and partly on account of it we work with storage, and of course we can manage with storage. But there are people going over from England here to set up electric works in Ireland by alternating currents. Now, alternating currents will not store, and this kind of thing will absolutely prevent any kind of use of electricity by water power on Sunday morning or Sunday evening where there are alternating currents. It can only be met by storage and that at a considerable expense. The provision is utterly useless on rivers like the Galway river and I should like, on account of that, Parliament to give the Fishery inspectors more power. That appears to me to be imperative, and I think in the interests of this coming industry it should be done.

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Mr. Seton-Karr—continued.

6635. Do you wish the Fishery inspectors to have power to grant exemptions?—Exactly, I simply want the fishery inspectors to have power to protect the thing rationally.

Chairman.

6636. To do what?—To allow this close time to be varied and to be allowed to grant exemptions as to shutting the mills down on Sunday where it is not needed.

Mr. Finlerton.

6637. I suppose it comes simply to this that all the water you use in your mill would be an imperceptible addition to the matter flowing in the Galway river?—Yes.

6638. And it is not required for the purpose of the fish passing up?—Not at all.

6639. Are you desirous that those powers of exemption should be given to the fishery inspectors in order that in these exceptional cases those rules should not be rigidly applied?—Certainly. You see electricity was not thought of when these laws were made.

6640. Supposing you were obliged to erect a plate or fry guard or whatever you may call it and you are not in a position to erect a guard at the intake, what would the result be?—According to the evidence here that smolts do not go back again up the river if you put on a guard at the turbines the smolts would die at the guard.

6641. Have you no bye-wash at your mill?—We have a bye-wash; the other mills have not bye-washes. We put up a temporary kind of bye-wash while we were doing our work, and I am not quite sure whether we did not do it by permission.

6642. Could smolts not go down the bye-wash?—If the guard was put up at the bye-wash they could no doubt, but then I am not speaking for myself. I am simply giving this case of my own, to let the Committee know that there are exceptions to the rule that the intake is always in the possession of the miller, because it is not. There are many other mills in Galway where they have no bye-wash and have no control whatever of the intake.

6643. If that turbine of yours gives as great a percentage of power, and is perfectly harmless to the fry, would it not be better for the mill-owners throughout the country to use that kind of turbine and escape the necessity of putting up any safeguards?—Certainly, I think if they used that turbine they would need no safeguards at all.

Mr. Seton-Karr.

6644. You mean, do you not, if they put up this kind of turbine you are speaking of?—Certainly if they use that turbine and a bye-wash at the same time, the turbine itself, in my opinion, is a perfectly efficient grating, because anything that passes through the guides of that turbine will pass through the turbine itself harmlessly. I should like to point out here, that there is only a short space in which a fish in a turbine like this, and under the head this works at, has not perfect control of itself. The fish will be able to enter that guide blade having perfect control of itself, that is, I do not think there will be danger of his being smashed here. Then it will

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[Continued.]

Mr. Seton-Karr—continued.

come to a point here, where the velocity will be too great for it, and it will certainly be carried a certain distance in spite of itself, but it will very soon reach a place where it would have perfect control of itself. There is only the distance from here to here where it will not be able to take care of itself.

Mr. Macartney.

6645. The system of the Hercules turbine is Professor Thomson's, is it not?—Practically all the modern turbines which are employed are on Thomson's principle.

6646. Are you aware that the principle has been adopted in the Loeffel?—Yes; in Professor Thomson's turbines the guides are rather more close set than that. I have a picture of Thomson's turbine here, and the guides of that turbine are adjustable, and they would look to me to be a little more dangerous to fish (that is, judging altogether theoretically, and without any practical experiment) than this kind of turbine; this is a picture of Professor Thomson's turbine (*the witness produced the same*), these are the guides, and they are adjustable, but they cover a considerable space, there are four of them to the wheel, you see, but they have all that space from there to there for the fish to get in.

Mr. Seton-Karr.

6647. I suppose it depends in what position they are placed if they are movable guides?—Yes, with the close-set turbine.

Mr. Pinkerton.

6648. What is the horse-power of your turbine?—They are 75 horse-power each, with a nine-foot head.

6649. And you have two turbines, have you not?—Yes, but in winter-time our head rises; I think we have 200 horse-power in winter at high water; speaking humbly and theoretically there is a chance if a fish is caught in a close-set turbine half-way it would be cut across as with a pair of scissors, that would be my view without an experiment.

Mr. Seton-Karr.

6650. In speaking of a close-set turbine, do you mean that the clearance here between the guides and the vanes is very much smaller than in this particular turbine you are talking about?—Yes.

6651. You are a practical engineer, I understand, are you not?—Yes.

6652. How many years experience have you had?—Eighteen.

6653. Did you superintend the erection of these turbines yourself?—Yes, I did, I put them in their places.

6654. I understand that they are very large wheels?—Yes, they are.

6655. What did you say the diameter was?—They are called 42-inch.

6656. That is a large turbine is it not?—Yes, the draught tube is four feet 11 inches, that is about four feet nine inches in the inside.

6657. And is the velocity low as compared with other turbines?—The velocity altogether depends on the head.

Mr. Seton-Karr—continued.

6658. But that class of turbine with a large diameter and a comparatively low head has a comparatively low velocity, I believe, as compared with many other turbines, has it not?—No, it has just the same velocity any other turbine would have with that fall or higher.

6659. Taking for instance a Loeffel?—Exactly.

6660. Or a turbine that was closely set?—I am not right in saying it has a higher velocity than some turbines would have on that fall.

6661. Do you say that a higher velocity than some?—It is a thing one cannot speak generally upon. I know all the inward and downward turbines have a higher velocity than a mere inward turbine.

6662. Are not you prepared to give a definite opinion?—I am, but I cannot do it in two or three words. I could almost write a treatise on it.

6663. Will you shortly mention any other variety of turbine with a small fall which would have a greater or less velocity?—All inward and downward turbines would have the same velocity as that. The American turbine is an inward and downward turbine.

6664. This is an American turbine, is it not?—Yes, but there is a turbine called the American turbine.

6665. Would it have the same velocity as this?—Yes.

6666. Then you are not prepared to say that the velocity of your turbine is any lower than the velocities of an ordinary modern turbine with that head, are you?—No, the fact is the higher the effective velocity the better.

6667. It is quite clear that the clearance here is considerably larger than the clearance in a good many other turbines as to which we have evidence, is it not?—Yes.

6668. In fact it is the exception rather than the rule in the modern turbine to have such a clearance as that?—Yes, but I say that is the proper thing.

6669. Would not the fact that the clearance was four and a half inches instead of half an inch make all the difference in the world to the safety of a fish?—I was careful to say that I would not give a definite opinion without making an experiment, but I say humbly speaking it would be so.

6670. In your opinion, and I ask you as an engineer and a practical man, would it not make all the difference in the world?—I do not know about that.

6671. Could you put your boiled eggs and glass bottles in a turbine with a clearance of half an inch?—I would not expect it, but Mr. Diamond has written to newspapers and says he has put up netting and that sort of thing and has not found any damage to fish.

6672. You were not present were you when he did that?—No, but these things affect my mind.

6673. I am asking you of your own knowledge?—I have not made experiments.

6674. The experiments that you tried at all events were through this turbine of yours, with a very low head, were they not?—Yes.

6675. And

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[Continued.]

Mr. Selous-Kerr—continued.

6675. And the turbine was doing no work, was it?—Yes, it was doing some work.

6676. What work was it doing?—It was driving a dynamo. The fact of the matter is the turbine is so powerful that we have not dynamo enough.

6677. Was it doing its ordinary work?—I believe it was.

6678. I understood you to say that when you made those experiments it was not doing its ordinary work?—No, it was doing its ordinary work when I was there, but the four feet head is mentioned in the letter from my partner, dated 18th May.

6679. You told us just now that there was a four feet head when you made your experiment, did you not?—No, will you read his letter to myself and you will see exactly how it was. What I argue is that there is more danger of an egg being cracked with four feet head and the turbine running at a higher speed than if the turbine is running with its full head at a proper speed. I said that if the turbine was stopped altogether, and you ran the water through it with a four feet head, that egg would certainly be cracked. I do not say it would do any harm to a fish but the water coming through those blades would impinge on the vanes on the turbine, which I say it does not do when the turbine is running.

6680. Will you read this letter from your partner if it has not been already read?—Yes. The letter is dated 18th May, and says: "Your telegram to hand and made following experiment. Boiled four eggs six minutes, of which two were floated with cork attached with shells. Head of water four feet, gate three-quarter up, the full opening is 20 inches so that three-quarters would be 15 inches, "speed 56 per minute." That would be less than the proper speed because that is 64 revolutions per minute. "The two floated eggs came out at once in full but bruised (same as one egg sent)." He says he sent one bruised egg but that the other was perfect. Therefore the other must have been bruised in the post. "The two eggs forwarded by letter post were found under turbines one alright and not damaged. One of your eggs (those were the eggs I put into the turbine myself on Monday) was found at the same time in a jelly state."

Mr. Hosier.

6681. Were those the unboiled eggs?—Yes. "I hope this will be of some use," he says.

Mr. Selous-Kerr.

6682. Are these eggs you produce just as they were sent to you?—Yes.

6683. Do I understand you to suggest to the Committee that that damage was done in the railway?—I do not say all the damage, but all the damage to one egg must have been done in the railway.

6684. Did you unpack them?—Yes.

6685. How were they packed?—In cotton waste in a tin box.

6686. Are you aware that raw eggs are sent in immense numbers from Ireland by railway?—Yes, and I expected them to come perfectly safely.

O.B.

Mr. Macartney.

6687. Are you also aware that a considerable number of them are damaged?—Yes, I should say they are; I do not think they all come safe.

Mr. Selous-Kerr.

6688. I think we are entitled to assume, are we not, that the damage to that egg was done in the turbine?—I simply lay all the evidence I have before the Committee.

6689. You are not prepared to say one way or the other whether that was done in the railway or turbine, are you?—I am prepared to say that I believe from the letter of my partner that one of those eggs came through the turbine undamaged.

6690. Do you say that the head was only four feet?—Yes.

6691. And your ordinary head is seven feet, is it not?—Yes.

6692. But you put it down to four feet for the purpose of making those experiments?—You must remember there is considerable risk. These things are buried in nine feet of water.

6693. You mean there would be considerable risk to the egg, I suppose?—The risk is that it will get smashed against these things, and if the egg is placed between a pair of these, and you can lower it down, it will be better. I lowered my eggs down like this (describing) as nearly as possible opposite to one of these openings.

6694. While the turbine was running?—Of course while the turbine was running.

6695. Under the lowered head?—It was lower than nine feet, but it was more than four feet when I did it, but I lowered the head, as I told you, for the purpose of getting this egg fairly between two of these blades.

6696. What was the head when you did it?—I did not measure it.

6697. Was it five feet?—It was certainly more than five feet. No, I should say it was about five feet on looking at the drawing. I know from the height the water was on the turbine and that is five feet nine inches from there to there, so that the head when I tried my experiment was about five feet.

6698. Did you lower it down carefully, so as to come between two of these fixed blades?—As nearly as I could manage it.

6699. So far as you know only one egg came out uninjured?—Quite so, you have my partner's letter before you; that is all I can say about it.

6700. You said just now that the velocity mentioned in your partner's letter was 56 revolutions a minute?—Yes.

6701. And you say your ordinary number of revolutions is 64?—Yes.

6702. That is something like 30 per cent. higher velocity then, roughly speaking, is it not?—Yes.

6703. Then again, when these experiments were made, the velocity of your wheel was lowered from 64 to 56 revolutions per minute, was it?—Yes, but I also say that it would have been certainly better to have placed the thing before the Committee with the normal speed, if we could easily have done it.

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6704. As

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Mr. PERRY.

[Continued]

Mr. Seton-Karr—continued.

6704. As a matter of fact it was not done; that is all I want to know!—No. I may explain that this experiment was a sudden idea of my own before coming over here, and I did it immediately before I left Galway. There was not time for any considerable elaboration. But to my mind it is just as satisfactory and more satisfactory than if the experiment were performed with the full working head.

6705. That is your opinion only, is it not?—Yes.

6706. But as a matter of fact were any experiments made when your turbine was working at the ordinary rate of speed?—No, but if the Committee think that an experiment of that kind will be of any use, I will undertake to perform any experiment the Committee asks me to perform with this turbine, and if you like I will have it performed in the presence of witnesses.

Mr. Macartney.

6707. Would you be good enough if you do that to invite Sir Thomas Bradly there?—Certainly; Mr. Hornsby was present when those experiments were made. I am not at all opposed to salmon fisheries, and I am prepared to give any facility about any place that may be wanted.

Mr. Seton-Karr.

6708. I want to ask you a question about the impact, I confess I totally fail to understand for what reason you say there is a less impact when there is a lower head of water than when there is nine feet of water?—There is no impact at all when the turbine is going at a proper speed, and the water is at the proper head; if the turbine is a proper one there is no impact whatever, but if the speed is not the proper speed, then I say there may be impact and commotion.

6709. Is this a question on which you speak with the authority of an expert?—Certainly.

6710. You have studied the question, have you?—Certainly.

6711. By impact, do you mean the pressure of the water on these vanes?—No, pressure is different from impact; when you drop a thing, that is impact, but if you press, that is another thing altogether.

6712. There may be greater pressure, although less impact, is that what you mean?—No, I say there is no impact at all with a properly constructed turbine.

6713. Is it possible that you can have greater pressure with less impact?—You would have more effective pressure.

Mr. Pinkerton.

6714?—Can you get pressure without impact?—Yes, as much as you like. The most elementary thing in mechanics is this, that if you could possibly have this lead pencil infinitely hard to drop on an infinitely hard surface, no matter what may be the fall, it meets that surface with an infinite pressure. That is the nature of impact; it is owing to the spring that things are not broken, just the same as with buffers of a railway carriage which are made with springs to prevent damage being done to the carriages by impact.

Mr. Pinkerton—continued.

But if you have impact between the particles of water here, you must have commotion of the water, and that means a loss of energy.

Mr. Macartney.

6715. Is not the value of Mr. Thomson's invention that it does away with the impact?—Yes, certainly.

Mr. Seton-Karr.

6716. Is it correct to take your meaning as this, that where the turbine is working with plenty of water and there is less work to do they shut these gates down, and therefore a smaller quantity of water comes through and that gives the impact in the method described by this drawing?—That is impact there (pointing).

6717. It means that the whole chamber is not filled with water, and that what does come through strikes with an impact on the vanes, does it not?—There may be impact, even when it is filled with water, but the impact disappears in eddying currents.

6718. But even when there is no impact, there may be great pressure, may there not?—Certainly, and it is the effective way of raising use of your water power to have pressure without impact.

6719. Do you think there is less danger to the fish when there is great pressure and no impact?—Certainly; what a fish experiences passing through there with a properly constructed turbine is simply a mere variation of pressure. It is just the same to the fish as if it rose to the surface of the water. The fish does not know anything about it, unless its head may be turned with a little bit of a swell, as I saw people turned about by acrobats the other night. It may make the fish a little dizzy, but it does not get much of a turn. That is a point I wish to bring before the Committee. Someone, in giving evidence, said the fish are whirled about at a great rate. It certainly is whirled about, but the time during which it is whirled about is simply the time it takes passing from here to the exit. If I were to put a number of fish in that turbine, they could not all take the same path of course, because some of them would be side by side, but I am taking a fish meeting that vane there, and as the vane goes round, I have drawn the curve there, showing the acceleration of the fish. Of course there are some assumptions. That represents the path of the fish. He comes out here and then he is side, there is a velocity here of about seven feet per second. There is a velocity here across there of between 14 and 15 feet per second, and that is, roughly, about the same velocity as it got here.

6720. Do you know anything about the habits of salmon. I have not made any special personal observations of them. I have read about them of course.

6721. Are you a fisherman?—I am a trout fisherman.

6722. Have you ever caught a salmon?—I have caught smolts because they are greedy and often take the fly.

6723. You have caught them with a trout net, have you?—Yes.

6724. I hope

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[Continued.]

Mr. Seton-Karr—continued.

6724. I hope you have always put them back when you have caught them?—Certainly.

6725. You say you made an experiment with smolts through this turbine, do you not?—It was not I, it was really Mr. Hornsby; I arrived just after it was over.

6726. But you have given evidence to-day with regard to an experiment made with smolts through this turbine?—Yes.

6727. And I think you said you did not catch any of them on the other side of the turbine?—I was informed they did not catch any of them in the net; the idea was that the damaged fish would come into the net, but if they were not damaged they would swim about. It was not I who advised that experiment at all.

6728. Nothing was learned from that experiment, I believe. They did not catch the fish, and did not know what became of them. Is not that so from what you say?—Yes. I say they did not get any damaged fish; but my reading of that is that they were none damaged or they would have got into the net.

6729. They did not get any live ones, did they?—They saw the live ones below the turbine.

6730. Are you aware that it takes a very slight blow to kill a smolt?—No.

6731. Do you not think it does take a slight blow to kill one?—That is altogether a comparative matter. What is a slight blow?

Mr. Pemberton.

6732. Do you think a blow that would break the shell of an egg would kill a smolt?—I should say not.

Mr. Seton-Karr.

6733. Are you aware that we have been informed by expert fishermen that a blow that would hardly dent a piece of wood would kill a smolt?—I know that. I have thrown smolts into the water from a height which would give them a much greater velocity than the velocity of that turbine, and they have swum away uninjured.

6734. They might have died afterwards, might they not?—Probably, and some of them found their way to the fishmongers. They did not appear to be dead when I threw them in.

6735. However, you are not prepared to say anything about the comparative effects of a blow on a smolt and a piece of wood, contradicting the evidence we have had, are you?—I would not take a fisherman's evidence about smolts. It is a naturalist's business. I have heard any amount of rubbish, or at least what the books call rubbish, talked about smolts.

6736. You would take an engineer's evidence about turbines, would you not?—Yes.

6737. Why would you not take a fisherman's evidence about smolts?—That is another story. The question as to the habits of fish is altogether a naturalist's business.

6738. At all events, to your knowledge no experiments were made with smolts through your turbine, with its ordinary head and its ordinary working speed?—No, no special experiments were made, but when the water has been lowered, I have seen the smolts about the turbines

Mr. Seton-Karr—continued.

in numbers. You see we may let these turbines become bare, and when the water is going down it is perfectly easy to see the smolts about them. I have seen them myself in quantities.

6739. I think you said the lessee of the Galway Fishery treated you very well?—He did and does.

6740. In what way?—In every imaginable way.

6741. Are you very excellent friends?—Yes, perfectly good friends. If I know of any poaching in the river I tell him of it.

6742. Mention the way in which he has treated you well; I only want to know the facts?—He has not complained of our running these turbines without putting up these guards. He puts up a decent guard of his own in the shape of a netting, at the intake, and no one complains.

6743. Then no fry get into your race then, do they?—They do indeed.

6744. Even if he has put a guard up?—Yes.

6745. What does he put it up for; to keep the full grown fish out?—I do not know.

6746. As a matter of fact you take a very small flow of the river, do you not?—We take a great deal, but the river is a big thing.

6747. I thought you were complaining that in your opinion it was not necessary for you to have a Sunday stoppage, because you did not take anything like the whole flow of the river?—Certainly not.

6748. You take a very small proportion of the total flow, do you not?—Certainly.

6749. Then the smolts have plenty of opportunity of getting to the sea without going down your turbine?—Yes.

6750. As a matter of fact, do you think many smolts do go down your mill-race?—Yes, I am quite sure; I have seen them in large numbers, both above and below the turbine.

6751. Are you sure you know a smolt when you see it in the water?—I see what I call smolts.

6752. At the same time large numbers go down the river without going near your turbine at all, do they not?—Certainly.

6753. What size is the grating or netting at the head of your mill-race?—I did not measure it, but it looks a large-sized netting; I should say an inch and a-half.

6754. Is it bars or a lattice?—No, it is a mere net.

6755. A rope net?—Yes.

6756. Is it put down just for the three months that the fry are running down?—Yes.

6757. Then it must be put for the purpose of keeping the fry out of your mill-race, must it not?—I should say so.

6758. I thought you said just now, it was not?—I do not know; it is put down by the lessee of the fishery, and what his purposes are I do not know.

6759. But should you imagine it was put down for the purpose of keeping the fry out of your mill-race?—Yes.

6760. And it has never affected the working of your mill in the least, has it?—It would affect the working of the mill if we were working up to our full power, but, as I said some time ago,

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we are not using our full power now; we will do so as our necessities increase.

6761. You are on excellent terms with the Galway fishery owner, I understand?—Yes.

6762. Have you ever complained about this net?—No, it has done us no harm at present.

Chairman.

6763. You say you only want a small portion of the river, therefore it would not make any difference to you, would it?—We are not working up to our full power.

6764. If you have only a small portion of the river the putting down of the net would not interfere with your working at the full power, would it?—Yes, it would.

6765. And you told us you have no mill race, did you not?—It would affect it considerably, because if we were working up to our full power, it would affect the level of our head-race to the extent of the nine inches I have described, and not only ours, but all the other mills who use water from the same head-race. Then it would affect us still worse than in ordinary cases, because it would affect the flow over our fixed sill, which has been fixed by the Board of Works. It does not do us any harm now, but if our customers were up to our full strength it certainly would affect our power.

Mr. Seton-Karr.

6766. That state of things has not yet come about, has it?—No.

6767. I understood that the netting was put across the head of whatever millrace you have, so that all the water that comes to your turbine passes through this netting?—Yes.

6768. How many years has he been in the habit of putting this netting up?—We have only had our mills for three years, and I can only speak as to that time.

6769. Has he had it up all that time?—I think so, but I know this year he has made a special gap in the weir to let these smolts down. There is a long weir on the river; works have been carried out in order to maintain the navigation on Lough Corrib, and there is a long weir. Both the navigation of the Lough and the water power, and everything has been dealt with by the Board of Works, and there is a long regulating weir, and in this weir, Mr. Miller, the lessee, has cut a gap close to where he puts the netting to allow these smolts to go through.

6770. To go through where?—Into the main body of the river.

6771. You mean in the mill-race just above his netting?—Just above his netting.

6772. So that the fry coming down to the netting can go through this gap into the main river again?—Exactly. But I do not think anybody would be afraid of fry coming through our turbine. I do not think Mr. Miller is afraid of it.

6773. I did not quite follow all your figures with regard to the iron plates you were speaking of, and the alteration of area that would be required, but the substance of what you told us was, I think, that if a grating of that kind were put up in front of a turbine you would want three times the area in order to get the same flow

Mr. Seton-Karr—continued.

of water?—Not a grating of that kind, but a perforated plate, making certain assumptions.

6774. What assumptions were you making?—That the total area of the perforation was equal to the total area of the solid part. That was the first assumption.

6775. But the only question you need to consider is the area of the perforations, is it not?—No, you must consider the other question, because it is blocking up your headrace.

6776. The area of perforations gives you the amount of water that goes through, does it not?—Exactly, and, as I am saying, that is half the pre-existing area.

6777. But you could have your holes closer together, could you not?—Not much. I am taking that as a reasonable assumption. Of course my calculation varies with any difference you may make in the data.

6778. Do you mean to tell the Committee if a submerged or perforated trough was put down, such as has been suggested or described to us by other witnesses, that it would require three times the area in order to let through the same amount of water as went through before?—Certainly, with the data I give, that is assuming a velocity of one foot per second in the headrace.

6779. What was the other assumption?—That the area of openings in the plate was equal to the area of the solid part of the plate.

6780. And continued in that same proportion?—Exactly.

6781. Have you the same objection to a grating of that kind which is used at the Cork Water Works?—There is not the same objection to a grating of that kind. One objection to any kind of grating, of course, is as to the quantities of weed that collect on it.

6782. But we have been told that that can be easily cleaned; what should you say would be the increase of area required if a grating of that kind were erected?—If that grating was kept clean, I would say, roughly, the area would have to be more than double.

6783. How do you explain that, if they have put them up at the Cork Waterworks, and that not only have they not interfered with the flow of water, but that the head of water beyond the grating is higher than the water outside the grating?—There are some people very easily satisfied.

6784. But this is a question of fact?—I know, but there are some people very easily satisfied.

Mr. Macartney.

6785. I do not know whether you are aware that at the Cork Waterworks the original supply of water is much more than is required?—Of course, that is what I was going to say. When we bought our mills we bought three, and at the two we have dealt with the water-power was only 20 horse-power, but the people who had them worked for years and years with 20 horse-power. Now we have made it, under the same conditions, 200 horse-power.

Mr. Seton-Karr.

6786. I am asking you a specific question, I want to know how you account for the fact that the gratings at Cork Waterworks have not only

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not interfered with the water, but that they leave a head of water inside the grating higher than outside the grating. How do you account for that state of things?—The inside higher than the outside?

Mr. Macartory.

6787. The water does not keep its own level, according to the evidence of the gentleman who came here?—That can be explained.

Mr. Seton-Karr.

6788. Here are the turbines, here is the grating, and we have had it in evidence before the Committee that the water goes in a curve like this instead of going in a curve like that, which would show that the supply of water was not sufficient, and which shows that the water inside the grating is more than sufficient (*making sketch*)?—That does not surprise me a bit. Suppose that is your grating, and here is the surface of your water, that is how it would be (*describing*).

6789. But that is not the evidence we had?—I do not care what the evidence is. That is the way it would come.

6790. Do you imagine that is the way it would come?—I am quite sure of it.

6791. But you have not seen the Cork Waterworks, have you?—I do not care; I do not need to see it for that. I will explain how that will happen. That little bit of difference of level might be so small that a rough observer would not notice it.

6792. You are exaggerating that sketch a little, are you not?—Yes, I am. What happens is this. You have the water coming up to this grating with a certain velocity, but the grating checks that velocity, and here you have the water quiet.

6793. It is running into the turbine, is it not?—It is. But the energy of this jet of water disappears somewhere, and it disappears in raising the level of the water inside. The same thing happens at our own sluices. Suppose you have all like that, and there is the bottom of the race, and suppose your water is tumbling down a thing like that, you have that sort of thing happening. If you go inside our mill the water is actually coming one way, but if you throw a chip of wood into the water it will flow the reverse way. It is simply the energy of the falling water that raises the level.

6794. But still the net result is, in the case of the Cork Waterworks, that the flow of water where it goes into the turbine is not in the least interfered with, is it not?—No, the net result is that that grating does away with some of the energy of the water. It is impossible to be otherwise. You simply convert energy of motion into energy potential. A particle of water flowing in a pipe has energy of three kinds. You will find it all set forth in that Cantor lecture, and I may say my brother refers to me in that lecture as a hydraulic authority. A particle of water has energy of three kinds; it has energy potential, that is the energy due to the height of the particle of water above the water in the tail race. That is energy potential. It has energy

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Mr. Seton-Karr—continued.

then of motion. That is $\frac{w v^2}{64 \cdot 4}$ (w is weight v velocity). It has that energy and it has this energy of pressure. These kinds of energy are convertible one way or the other; and the phenomenon described by you is simply a conversion of the two.

6795. Do you call it a phenomenon?—Certainly I do. Some people are in the habit of dealing with the word "phenomenal" as extraordinary. We consider anything a phenomenon without imagining it to be extraordinary.

6796. I do not want to go into too many of these scientific figures, and I do not want you to take up too much of the time of the Committee in that way; all I want is practical information; we have evidence that at the Cork Waterworks those gratings do not interfere with the flow of the water in the least; you have given us a great deal of scientific explanation in answer to that, but I am not satisfied personally?—You might as well tell me that a man going out and paying a 1s. for 9d. gets an advantage.

6797. You said just now that a grating of that kind, which is the grating they have now at the Cork Waterworks, put down in a mill race, would require something like, in your opinion, twice the surface in order to give the same flow of water?—Certainly.

6798. That has not been found to be the case in the Cork Waterworks?—I accept their observation but not their interpretation. You might just as well tell me that paying a 1s. for 9d. was an economic operation. Any obstruction in a stream of water is bad.

Mr. Pinkerton.

6799. The Cork Waterworks do not require an excessive amount of water, and it is not applicable to this case at all, is it?—No.

Mr. Seton-Karr.

6800. We are talking about the identical grating which they have. It has been suggested to you by Mr. Pinkerton that the Cork Waterworks' supply of water is greatly in excess of their need. Would it not follow, if a grating of that kind was put up, and you say twice the area would be required to give the same flow of water, that if they do not increase the area, therefore they would diminish their supply of water by one-half?—No, that does not follow at all.

6801. Then I do not understand your figures. You said just now that the area must be increased by double. Is it not a fact that if you leave the area as it is, then you must decrease the water supply by one-half?—You have a very rough and ready way of dealing with mathematics. If your hydraulic formula would do it, it would simplify the books immensely.

6802. Is it not the fact that it would reduce the water supply by one half?—Certainly not. But I say, to give the same quantity of water, you would need to have double the sectional area of that.

6803. Then does it not follow as a mathematical certainty that therefore with the same area of grating you reduce the supply by one-half?—No, that is not mathematics at all.

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6804. Then

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Mr. Seton-Karr—continued.

6804. Then how much do you reduce it by?—That is not a simple question to ask.

6805. You have given us a specific figure with regard to a given area?—I described the perforated gratings as reducing the level of the water 9 inches, or that if you do not reduce the level of the water at all, you would need to have three times the area. Then the question of a flow through a grating like that is an exceedingly complicated question, and one I could not answer off-hand.

6806. Can you give a fairly rough idea of how much a grating would reduce the flow of water in a given space?—It would not reduce it at all if you kept up the velocity. If you doubled the velocity it would not decrease it at all; but do you not see that that simply means a reduction of head; but all these things are far more complicated than you appear to imagine.

6807. I am quite prepared to accept your explanation about it; you say, if you increase the velocity you would not require to increase the area of your grating?—Certainly not; it simply then means a loss of head.

6808. But it means a loss of nothing if you increase the velocity, does it?—It means a considerable loss, because you lose the velocity on the other side; again you waste your energy by driving it through a grating.

6809. Will you answer me this; in what proportion has the grating erected at the Cork Waterworks reduced their flow of water. Let X represent the flow of water before the grating was put up; then what represents the flow of water after the grating was put up?—I should have to examine the Cork Waterworks and get up my own data to answer that; it would probably take a whole evening to work the thing out.

6810. If you can make up your calculations you can send them to the chairman?—If you will give me directions to go to Cork I will.

6811. Do you know Mr. Gihon's mill at Lisnasillan?—No.

6812. Would it surprise you to hear that they have had a submerged trough for 25 years without any complaint there?—It takes a good deal to surprise me about hydraulics.

6813. Would it surprise you to hear that this submerged trough has been on these mill premises at Lisnasillan for 25 years without interfering with the turbine?—It interferes more or less; some people are very easy in their minds about the water supply; if they get as much as they need they do not want more, but I am exceedingly greedy; I want to get every foot and pound out of it that is in it, and we have done that at our place.

Mr. Macartney.

6814. I should like to read you what Mr. Gihon said about this on page 39, Question 1,076. This is his evidence: "The turbine is one of McAdam's"?—Yes.

6815. Everybody who uses McAdam's turbine is obliged, apart from anything else, to put up a grating, I believe, is he not?—Yes.

6816. "The turbine is one of McAdam's, and has worked first rate, but there are inconveni-

Mr. Macartney—continued.

ences connected with it. Owing to the shield it is liable to be stopped up by grass and leaves, and another defect is now in the improvement in these turbine wheels. They are made without the shield, and the shield lessens the water power, as scientific men tell us." Then he went on to inform the Committee that his firm intended to put up another turbine; they were not going to erect McAdam's, and they were not going to erect a shield?—Just so; before we went to Galway they worked our mill for 100 years with 20-horse power, whereas they might have had 200-horse power.

Mr. Seton-Karr.

6817. You do not require more horse power than you at present have got, do you?—We do; we are simply beginning; we would find ourselves in bankruptcy if we did not do more work than we are doing at present. We are putting down more electric mains and supplying more customers.

6818. Does that mean you will want more water?—No, that would be simply working our turbines up to their power.

6819. So far had you ever been prevented working them up as far as you want?—No; personally I have nothing at all to complain of; I have no antagonism whatever to fishery owners.

6820. And have you anything whatever to complain of with regard to the existing law?—I have certainly; that is the thing.

6821. What do you complain of?—If we were dealt with according to strict law, I should have a great deal to complain of.

6822. What would you have to complain of?—These gratings; we would have to put up gratings where we have no authority to go, and we have to complain of this Sunday close-time. We light the Protestant Cathedral in Galway, and of course we have to do a lot of lighting in the winter time, when there is no necessity for this close-time being maintained, and we want to get out of that.

6823. You have never been asked to put up a grating in front of your turbine, have you?—No, but the law is there, and we may be asked; supposing the present owner of the fishery goes away, and we get another, who is a cross fellow, he may insist on the law; I simply want the law made intelligent all round.

6824. Then as far as you are concerned it is only a prospective injury you are afraid of?—I am afraid of nothing. I can manage to live, no matter what happens.

6825. I will go back again to the question of your turbine. As far as your experiments go, do they simply amount to this: that under a low head you put eggs, bottles, and fry into your turbine, and that some of the eggs and bottles were broken and the fry came out uninjured?—You will hear about that. Mr. Hornsby will be able to tell you about the fry better than I can, but for the purposes of this Committee I will perform any experiment you may direct me.

6826. Will you answer my question. Is that the sum total of your experiments as I have described them. Is that not about a correct summary

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Mr. Seton-Karr—continued.

summary of the experiments that have been made?—Yes.

6827. Have you ever known of any experiments being made with other turbines of a different kind to yours?—Not in regard to fish.

6828. You are only speaking simply of your own turbine, and nothing else?—Yes. I restrict myself to this specific thing.

6829. Do you think that the result of those experiments proves anything at all with regard to turbines of a higher velocity or of a closer set?—It does not prove anything with regard to turbines of a closer set, but I do not believe the velocity matters much.

6830. But you think the set does?—Yes, I would imagine, looking at it, that the set does.

6831. Do you think it is possible for fry to go a M'Adam or a Loeffel turbine, which has only a clearance of half-an-inch?—A fry could not get at a M'Adam.

6-32. Do you think a fry could go through any of those turbines uninjured?—I think it is possible.

6833. Do you think it is likely?—I think it is possible; but I think it perfectly likely that a proportion of them would be injured. I do not think a fry could get at a M'Adam turbine at all because of the close gratings that are put on for the purpose of keeping weeds out of the turbine, and not fish.

6834. Do you think that the gratings that are put on to keep weeds out would keep fry out too?—Certainly, they are quite close in the M'Adam.

6835. Do you think it is possible that fry going through your turbine, although they were not actually killed on the spot, might be so injured as to die afterwards in the river?—I do not think so.

6836. When I say fry, I mean smolts. Do you not know that smolts are a delicate little fish?—Even so, I do not think it is all likely they would be injured in that turbine. I would offer so much for each smolt that you could kill in it. I would give you 1*l.* a smolt.

6837. That is a fair offer. You say that your experiments give you no opinion about turbines of a close set?—No; if I wanted to know anything about a close-set turbine, I would experiment with a close-set turbine.

6838. You say you dropped that rule into your turbine?—Yes.

6839. You are aware that this rule is made of very hard wood, are you not?—Yes, certainly; but if it met an iron plate it would show some dent.

6840. Not necessarily, would it?—Yes, if it came with considerable impact. The water has nothing to do with it.

6841. Are you aware that a blow which would make no impression on this rule would kill a smolt. I know the smolt would not hit anything with the impact, and that rule would.

6842. Are you aware that a blow which would not make any impression on this ruler would kill a smolt?—It might.

Mr. Macartney.

6843. For instance, you might pinch a smolt to death between your fingers, might you not?—Yes.

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Mr. Macartney—continued.

6844. And you might pinch that rule between you thumb and fingers and it would make no mark on it all?—Yes.

Mr. Pinkerton.

6845. The extra length of that rule would make it run greater risk, would it not?—Yes; you see from the picture that there is room for this rule to pass through. I will say that it has a slight advantage over a fish, because it is a little lighter than the water, and the fish is of about the same specific gravity, so that the rule in passing through would keep up at the top of the water.

Mr. Seton-Karr.

6846. There would be a cushion of water, so to speak, between it and the iron-plate?—No, it would keep up *here* and coming through *here*, but the advantage fish would have would be that the fish would be flexible and shape itself to the passage, but this thing would have to come straight through like that (*describing*).

Mr. Macartney.] I wish to give some evidence as to the Act of 1848. I have here before me the Act of 1849, the fourth section of which contains the power of exemption, and repeals the 16th section of the Act of 1842. I have also here and before me the Bill of 1869 which was introduced by the Attorney-General for Ireland and Mr. Chichester Fortescue. That Bill does not contain the fourth section of the Act. The Bill was introduced by the Attorney-General for Ireland on the 16th March 1869, and in introducing the Bill he made a statement which coincides with the preamble of the Bill and the preamble of the Act. The only amendment made in the Bill while it passed through the House of Commons was an amendment in Clause 2 of the Bill, line 4, page 2, which struck out the word "permanent." Instead of there being "two permanent inspectors," the Act reads "two inspectors," so that the Bill left the House of Commons precisely in the same condition, with that exception, that it entered it; that is to say, that no millowner who had had his attention directed to the Bill could find within the four corners of the Bill anything affecting his interests. The Bill then went to the House of Lords, and in introducing the Bill the same statement was made as was made to the House of Commons. It was read a second time, and went into Committee, and passed through Committee without debate, and came up for third reading. On 16th of April (reading now from the Lord's Journals) I read "The Salmon Fisheries (Ireland) Bill was, according to order, read the third time." Then it was moved, "in page 2, to insert the following clause;" and that clause which is inserted, is the present fourth section of the Act. That section was introduced on the third reading in the House of Lords. I now have before me the Notice Paper of the House of Lords for that day, Friday, 16th April 1869, and on that Notice Paper this new clause does not appear, so that previous to its introduction into the Bill, which was read a third time and passed in the House of Lords, there was no notice to anybody who was interested

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interested in the connection between the salmon fisheries and the millowners or the water-power that any such clause had been brought forward or introduced. The Bill then went in the ordinary course through the House of Commons, and it went through the House of Lords, and received the Queen's Assent in the same month.

Mr. Seton-Karr.] Is it your suggestion that that clause has slipped in?

Mr. Macarty.] My suggestion is this, that when the Bill was distributed, after the only public statement made after the only debate that took place in the House of Commons, no one in Ireland, when the Bill left the House of Commons, knew of anything in it to alarm any millowner. It simply was a Government Bill dealing with certain doubts that had arisen about the inspection of fisheries.

Mr. Seton-Karr.] It was slipped in, you say, do you?

Mr. Macarty.] In the House of Lords, after the only debate that took place there was nothing mentioned about it, except the point I have mentioned; and as a matter of fact, the fourth section was put in on the third reading without notice to anybody, with no notice given on the Paper of the House of Lords, and therefore it was quite impossible for anyone to be aware of it in Ireland.

Mr. Seton-Karr.] Then it is your suggestion that that clause has slipped in without proper consideration, is it?

Mr. Macarty.] Yes, that is of course my suggestion, and that there was no possibility of its reaching anybody.

Mr. WILLIS BUND, called; and Examined.

Chairman.

6851. ARE you a barrister practising at the English bar?—Yes.

6852. Are you chairman of the salmon fisheries board?—Yes, I have been so for a great many years, and practically have had the management of that board since it was formed. Perhaps I ought to say I drew the Act of 1873 and the clauses in that Act which are practically incorporated in the Bill before you.

6853. Did you draw the Act of 1873?—Yes.

6854. Is it from that Act that the provisions in the present Fishery Bill are taken?—Mainly, I will not say they are verbatim, but practically they are.

6855. That is to say you find the words used are nearly identical, do you not?—Yes, they are practically identical, so much so, that in line 3 of Clause 4 the words "may be prescribed" are taken from the English Act, and there is a power in the English Act to prescribe the time; and I believe there is no such power in the Irish Acts.

6856. What has been the consequence of Section 58 in the English Act?—Would you allow me to say why the clause was put into the English Acts, and I will show what the consequence was. In 1861, as you know, there was a Consolation Act for England, and very elaborate clauses were prepared as regards gratings. Those were all struck out except one which is now the 13th section of the Act of 1861 by a Select Committee, and consequently there was no law in England whatever as regards gratings for mills and the millowners naturally object to having gratings placed. Secondly, this was an attempt to try and get gratings placed both at the inlet and outlet of channels to mills, and it was felt that you could not ask the millowners to pay the expense of doing this and putting the burden upon them. So the clause was drawn to make the fishery boards do it. The effect has been (speaking from my knowledge of the Severn and one or two other districts) that I do not believe more than four or five gratings have been put up.

6857. In fact it has been inoperative has it not?—Quite so. I will give you the reason.

Chairman—continued.

The mill-owners have objected, and the boards have refused, to incur the risk of taking legal proceedings.

6858. Has that been prejudicial to the fisheries?—Very. There is no doubt that in the spring of the year the fish that have spawned descending are killed in considerable quantities at mills, and in the autumn of the year the fish that are ascending to spawn are also killed at mills, particularly in small streams, because the rush of water to the mills is the predominant stream, and it leads them up there and they are both poached and killed by the mill wheels, and smolts also descending are killed in considerable numbers.

6859. Is it a fact from your knowledge of fisheries that the English salmon fisheries have to a very large extent been destroyed?—What from?

6860. From one cause or another?—Certainly. I think they are improving.

6861. And do you think unless they are protected there is no means of preserving them?—If they are not protected. As to the breeding fish and the young fish, no.

6862. Is it within your knowledge that turbines are injurious to young fish?—No. I do not know a case of a turbine being injurious. I know nothing about the case of a turbine in actual use.

6863. Assuming these gratings to be necessary, and assuming there to be one fishery and many mills on a river, do you think it would be possible for the fishery owners to enter upon those mills for the purpose of fixing gratings without inconvenience to the millowner?—No, I do not think it would be. My experience goes to this extent, that whatever grating you put up, is however desirable a form it may be, the millowner is sure to object to it. I have never known a case where a board has wished to put up a grating that it has not been objected to. We have had several cases.

6864. Do you think a millowner could erect gratings which would protect the fish without interfering with his rights?—In most cases. Of course it all depends on the supply of water.

6865. It may be more or less inconvenient, I suppose?

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[Continued.]

Chairman—continued.

suppose?—Yes. Perhaps I ought to say this (I dare say you have had a good deal of evidence with regard to it), that I do not think it possible to maintain your gratings all the year through. I do not think it would be fair on the millowner or that it would be possible to do it, because in the autumn, when the leaves are coming down, he would be interfered with. It depends, of course, on the quantity of leaves.

Mr. Seton-Karr.

6866. What grating are you speaking of?—At the head of the intake. The amount of leaves that come down is so large that it would carry away any grating.

Chairman.

6867. Would it be necessary then to maintain the grating?—I think a grating is always desirable, but what we do is to have one form of grating for the spring months and a larger form of grating for the autumn months, so as to let the leaves go through.

6868. Could you maintain what is called a lattice?—No.

6869. But a large grating you could?—Yes, because the leaves would go through, but anything the leaves could not round it would be impossible to maintain, and I think it would be too much to ask the millowner to maintain it.

6870. If the lattice is confined to the three spring months when the smolts are coming down the river, could that be done in your opinion?—Certainly, I am speaking as a millowner, and I certainly think it could be done.

6871. Can you tell us anything as to the habits of smolts and spawning fish?—The main migration of smolt is in the spring months, beginning perhaps the last fortnight in March (which is exceptional), through April, May, and the beginning of June. Those are the times when you want the small grating. For the ascending fish you want a grating at the tail race in the autumn.

6872. But those might be large gratings?—Yes.

6873. Because those are the large fish?—Yes, but I think you ought to be content with a small grating, say from the 1st March to 30th June.

6874. Is it important for the small fish, the smolts, as they come down the river to be protected, and not to be held in mill races so as to prevent their getting down the ordinary water of the river?—Most important for two reasons. You have been at considerable expense producing these smolts, your supply of fish depends on them, they are very voracious, every day they are kept they are likely to be poached, and they will take anything that is thrown into the water. The sooner, therefore, they get away the better. The great thing in salmon preservation is to get your smolts to the sea as soon as you can.

6875. And with fish coming up the river, is it important to turn them up the proper course of the river, and prevent them being turned into a mill race and kept there, or at the foot of the weir?—Yes, it is important to prevent them getting into a mill for two reasons; for instance, when the water gets low at night, there is a

Chairman—continued.

temptation to poach the fish; the second reason is they work up to where the mill wheel would be, and frequently get killed by the paddles. Every year one sees a certain number that are killed in that way.

6876. The salmon fishery in the river is a source of supply to the sea fisheries, is it not?—Yes, certainly.

6877. If the breeding of the fish in the rivers is destroyed it will destroy the supply of salmon in the sea, will it not?—Certainly.

6878. It is the source, in fact, is it not, from whence the salmon comes?—Yes, if they are not bred in the upper waters the tidal fisheries must fall off.

6879. They do not come from foreign countries, but from our rivers, do they not?—Yes, as far as I know at the present time that certainly is so. May I say one thing on Clause 6 of the Bill which is taken from the English Act. I have only known it used in one case, but it is a most valuable provision as regards salmon preservation, because there are certain rivers that are rocky, and where fish are very easily poached, which it is desirable to keep them out of. Clause 6 is found to be a very valuable provision for that purpose.

Mr. Seton-Karr.

6880. Are you speaking of Clause 6 of Mr. Macartney's Bill?—Yes.

6881. You admit that it is a valuable provision, do you?—Yes, I can give you two instances where we have used it. We have used it in the case of a short stream with a very rocky bottom, which for some reason or other the fish always run up, and where the water was very shallow. As soon as the water dropped they were at once poached. They were left and killed when the water ran off a little. If they spawned there, the spawn was all destroyed. Of course you want to use a little judgment, but I think there is no more valuable provision than one to enable you to keep the fish out of places where the bed is unsuitable for rearing the spawn, and where the fish are very liable to be poached. Certainly in two cases where we have done it it has been most advantageous. There is no such provision, I believe, in the Irish Acts at present.

6882. Do you think it should be added?—Yes, I think it should, if you will forgive my mentioning it.

6883. What do you think of the rest of this Bill of Mr. Macartney's?—As I understand the Irish law, the obligation is now on the millowner to put up and maintain a grating, and speaking, not as a millowner but as a Fishery Conservator, I think it ought to remain there. Also I do not think this matter of gratings ought to be dealt with alone. It is part of a much wider subject. You have fish passes and weirs altogether and the whole question of the relations of the millowner and the Fishery Conservators ought to be dealt with as a whole and not piecemeal. Otherwise, you see, if you took away the liability it would be quoted at once as a precedent for taking away a fish-pass somewhere else.

6884. Then you think it is a bad Bill do you?—I should

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Mr. BUND.

[Continued.]

Mr. Selous-Kerr—continued.

—I should say yes, for this reason that I think the Irish law is better.

6885. Do you think the responsibility and the cost of erecting gratings for the protection of fry should be on the millowners?—Yes.

6886. Is there any other good clause in this Act except Clause 6 which you have mentioned, and which you approve of?—Clause 5 is useful. Whoever puts up a grating ought to have power to widen the stream.

6887. They are comparatively unimportant clauses of the Act, are they not?—Yes.

6888. The important part of the Act is Clauses 3 and 4, is it not?—Quite so.

6889. And do you think they are both bad?—Yes, for the reason that I think the Irish law as it stands is better.

6890. Do you think that it would operate very unfairly on the fishery owners?—I think so.

6891. We have had evidence that this Act would ruin their industry, because, to all intents and purposes, it would allow turbines to be put up without any protection; and that it would lead to a good deal of litigation and trouble between fishery owners and millowners if it was endeavoured to be put into operation, and that practically it would not work. Do you agree with those views?—If you ask my opinion, it is this. I am speaking now as a millowner. A millowner will always put some grating for his own protection, otherwise the sticks and things that come down the streams would hrenk the blades of his wheels. I never saw a turbine at work, but I should say it would be still more so as regards a turbine.

6892. What would be more so?—The necessity for the grating.

6893. We have had evidence here from the fishery owners that this Bill is unworkable, and would ruin their industry, because it would result in turbines being put up without any protection as regards smolts; do you agree with those views, or any part of them?—To a certain extent I should say yes. I should say it would be very injurious to have turbines put up without gratings, but the extent of the injury I should not like to say without knowing the river.

6894. The point I will particularly ask you about is this; as an authority on the salmon fishery laws as well as having a knowledge of the habits of the fish, do you think that the operation of Clauses 3 and 4 would result in turbines being put up without any protection; do you think that would be the result of those clauses being enacted?—I do not know Ireland, and it is very hard to say; it might be so.

6895. For anything you know to the contrary, is it might be, might it not?—It might be; I was never in Ireland in my life, and I do not know Ireland, so I should not like to say.

6896. Do you think it is possible the fishery owners are correct in their view?—Yes, I think, to a certain extent, it would injure them, but the question is one of degree.

6897. It is a question of degree, in your mind, how far the injury would go?—Yes.

6898. And I gather that you are particularly strong on the justice of putting the responsibility of protecting fish from the turbines on the millowners?—Quite so; and I am also very strong

Mr. Selous-Kerr—continued.

on this, that any grating a fishery board proposes to a millowner he objects to.

6899. On principle, I suppose?—No, he says, "This will do so and so, it ought to be done differently." But he can always find one which he will not object to. I have met with that in many cases, where, under the 13th section they are bound to put up gratings. Under the 13th section of the English Act companies who take water for mills or other purposes are bound to put up a grating, and whenever you suggest a grating they find fault with it, but they can always find gratings themselves that will do.

6900. That, of course, is a very strong reason why they should be made responsible, is it not?—Exactly so.

6901. Do the English Acts confer powers on fishery boards to take land compulsorily for the purpose of erecting gratings or to enter on land for the purpose of erecting gratings?—No, they do not. We can proceed under powers from the Secretary of State under section 59 of the Act of 1873, which says: "In all cases of construction of gratings under the powers of this Act, the Secretary of State may, in such cases as he shall deem expedient, cause any water-course, mill-race, cut, beat or other channel to be widened at the expense of such board, so far as necessary to compensate for the diminution of any flow of the water caused by the erection of any grating, or shall take some other means to prevent the flow of water being prejudicially diminished or otherwise injured." The Secretary of State has power to order the works to be done.

6902. Does that include the compulsory power of taking land or going on land?—I should say it did, but I am not at all prepared to say I am right. The 45th section, which gives the power to the board to acquire land, does not mention gratings.

6903. I think you have studied the habits of smolts and are fully acquainted with them?—Yes.

6904. Do you think it is possible, taking an ordinary mill-race of 400 or 500 feet long, that smolts, having gone down the mill-race to the turbine, would afterwards re-ascend that mill-race and go back into the river?—I do not think so.

6905. They are bent on getting to the sea and never go up-river when once they are on their downward course, do they?—I never knew them strike up-stream then.

6906. You are using the word smolt in the strict sense, are you not; you mean, do you not, the fry. After he has put his silver coat on?—Yes.

6907. Then I take it it is, vital to the fishing industry that smolts should be protected on their way to the sea?—Certainly. I said it was a question of degree; it is a question of how much a river can afford to lose, because you can afford to lose a certain number, but in the interests of fishing the more smolts you can keep the more salmon you will get.

6908. I think Mr. Mann referred to his evidence to your book from pages 173 to 180, and I think you have written there that there are no powers to take land or enter on land to erect gratings in the English Law?—I know it is a power

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Mr. BOND.

[Continued.]

Mr. Seton-Karr—continued.

a power we inserted in the Act and that it was struck out.

6908. You have not changed your opinion from what you state in your book have you?

—No.

6910. Then may we take it from you that you look upon that as a weak point in the drafting of the Act?—I do, certainly.

6911. And that any legislation on that point must always have regard to the practical power of taking land or entering on land for the pur-

Mr. Seton-Karr—continued.

pose of erecting these gratings?—Certainly, because otherwise the statute is a failure altogether.

6912. Then this Act of Mr. Macartney's in failing to deal with that point has a very weak point in it indeed there, has it not?—It would be unworkable.

6913. Is that enough to render the Act unworkable?—Quite so; it is taking away the protection you have got and giving nothing else in its place.

Mr. R. L. MOORE re-called; and further Examined.

Mr. Seton-Karr.

6914. I UNDERSTAND, Mr. Moore, you would like to make some corrections and additions to your evidence?—Yes.

6915. Will you kindly take the note of your evidence in your hand and tell me what corrections you wish to make?—At Question 3713 the words "for each division" should be added to the end of the answer. The answer to Question 3714 should be: "Those for upper division are elected by those paying license in the upper or freshwater portion, those in the lower by those paying license in lower or salt-water division." The answer to Question 3717 should be: "Yes, but only one can represent a fishery valued at 100 £ per annum." The answer to Question 3721 should be: "Yes." The answer to Question 3757 should be: "I think not. Erne Fisheries gave, besides the 236 £ 12 s. 6 d. in August and besides 30 £ 10 s. in previous February when there was a drift it. This makes up the 267 £ 2 s. 6 d. as stated in the report of 1890." The answer to Question 3762 should be: "You will see from this that the cost to the lessees in Londonderry district is 1,255 £; in Coleraine, 240 £, and in Ballyshannon, 437 £ 2 s. 6 d. over and above, in these districts, the license duty or license duty and 10 per cent. on valuation." At Question 3763 the following words should be added to the answer: "And 95 £ more is paid to bring it up to the 10 per cent. on valuation which is 2,600 £." The answer to Question 3769 should be: "95 £ with 150 £ license-duty makes up 240 £, 10 per cent. on valuation." The answer to Question 3775 should be: "Of the lessees of the Foyle and Bann Fisheries." The answer to Question 3785 should be: "The Coleraine district costs the lessees of the Foyle and the Bann 240 £ in protection, in addition to license-duty, 55 £, and 95 £, which makes up 150 £, 10 per cent. on valuation." In the answer to Question 3792 the words: "3,000 £ worth of fish" should be "3,000 £ worth of salmon." The answer to Question 3805 should be: "Off the Foyle and Bann there are now between 70 and 80 drift-nets every year." The answer to Question 3825 should be: "Mr. Young's Fenagh, and Messrs Frazer and Haughton." In the last sentence of the answer to Question 3829 the word "was" should be "is." In the answer to Question 3843 the words, "having brought under notice" should read, "having

Mr. Seton-Karr—continued.

brought under their notice." The answer to Question 3848 should read: "The millowners have been treated most leniently, for no proceedings were taken against them I think until last year." The last sentence of the answer to Question 3854 should read: "It seems to me that in that fry-guard there ought to be a bar of fibre across the top for it always floats on the top." In the answer to 3855 the words: "but I saw none like that" should be "but I saw none choked like that." The answer to Question 3861 should be: "If it is a regular lead they will run up the tail-race. If the tail race enters the river at right angles or at weir, the head-race takes the water at a right angle to the river; the salmon are not likely to enter." At the beginning of the answer to Question 3867, the words "it was done" should be omitted. The last sentence of the answer to Question 3871 should read, "He had to strain the water through his fingers to collect little pieces of the fry." At Question 3881 the words "it from the ingress of fry" should be added to the end of the answer. In the answer to Question 3888, the word "saw" should be "same." In the answer to Question 3899, the word "indeed" should be omitted. In the answer to Question 3919, the words "new weir" should be "bad weir." In the answer to Question 3957, the word "injuries" should be omitted. In the answer to Question 3960 the words "and the mills appertaining to them" should be, "and the works appertaining to them." In the answer to Question 3963 the name "Shenton" should be "Shelton." In the answer to Question 3965 the words "in the river" should be omitted. The answer to Question 3973 should read "I believe the salmon fisheries are between 500,000 £ and 600,000 £ a year." In the last sentence of the answer to question 3979 the word "meeting" should be inserted after "representative." In Question 3989 the word "Bann" should be "Bann." In the answer to Question 3994 after the words "It is for the opening of the gates" should be inserted the words: "There are large drainage works there, and the turbine to lift the gates has about nine feet of water over it. Immediately on water being admitted to the turbine sluice, the gates begin to rise, the current sets under them, and the fry can pass uninjured."

Tuesday, 24th May 1892.

MEMBERS PRESENT :

Mr. Cox.
Sir John Whittaker Ellis, Bart.
Mr. Hayden.
Mr. Macartney.

Mr. O'Neill.
Mr. Pinkerton.
Mr. Seton-Karr.
Mr. Tomlinson.

SIR JOHN WHITTAKER ELLIS, BART., IN THE CHAIR.

SIR THOMAS BRADY, called in; and Examined.

Mr. Seton-Karr.

5916. I believe you have an intimate knowledge of the salmon fisheries of Ireland?—I have, and have had for a great number of years.

5917. Have you been connected with the fishery department since 1852?—Yes.

5918. Were you appointed Government Inspector of Fisheries in 1860?—Yes; I joined the public service in 1846; I joined the fishery department in 1852; and I was made inspector of fisheries in 1860.

5919. Will you kindly tell us exactly how you were appointed, and how your appointment differs from the fishery inspectors who represent the various boards?—I am appointed by warrant of the Lord Lieutenant under a special statute. That refers to my late appointment in 1869. Before that I was appointed Inspector of Fisheries by the Board of Works, who had power under 5 & 6 Vict. to appoint inspectors and other officers, and on the retirement of my predecessor, who was promoted to England, I was appointed Inspector of Fisheries in 1860, having previously been in charge of the Fishery Department from 1852.

5920. Then in 1880 you were appointed under a warrant from the Lord Lieutenant, were you?—No, in 1869. The Commissioners of the Public Works, who were Commissioners of Fisheries, first appointed me. They were commissioners who had the authority under an Act of Parliament.

(Chairman.)

5921. Who appointed you in 1852?—In 1846 I was appointed a clerk in the office of Public Works. I entered the public service in 1846. In 1852 I was made conducting clerk in the Fishery Department, and in 1869 I was appointed under a warrant of the Lord Lieutenant.

Mr. Seton-Karr.

5922. From 1869 you were a Government inspector?—Since 1860 I have been a Government inspector, because the Board of Works were the Commissioners of Fisheries under the Act of Parliament, and in 1869 I was made a special inspector under the Act of Parliament which empowered the Lord Lieutenant to appoint two permanent inspectors of fisheries.

Mr. Seton-Karr—continued.

5923. Did you occupy that post until the end of December of 1891?—I occupied that post until the end of December 1891. Then the Treasury considered that I came under the Order of Council of August 1890, which provided that every officer in the public service should retire at the age of 65. Having been appointed by warrant by the Lord Lieutenant under special Act of Parliament I took exception to this, and the matter is now *sub judice*. I have a friendly issue with the Irish Government upon that point, to be determined whether I came under the Order in Council or not, as decided by the Treasury. I received on the 31st December 1891, a letter from the Lord Lieutenant, stating that he wished before I retired from the public service, as I had to do, to place on record his high appreciation of my zealous and distinguished services to the State for a long period of years.

Mr. Tomlinson.

5924. Has no successor to your office been appointed yet?—No.

Mr. Seton-Karr.

5925. You were secretary, I believe, to the Special Commission appointed under the Act of 1853?—I was; at the same time holding my Irish office.

5926. Until its determination in 1868?—Quite so.

5927. I believe you have read Mr. Mann's evidence carefully as to the provisions of the law in Ireland respecting gratings at mills and turbines?—I have.

5928. Have you anything to add to that evidence?—I have not. It would be really a repetition of his evidence if I went through it; I do not think he has mistated or even overstated anything.

5929. In other words you corroborate his evidence in that respect to the fullest extent?—Yes, to the fullest extent.

5930. I wish to ask you a question with regard to the steps that have been taken by you and your colleagues in respect of exemptions which have been granted from gratings. Is it correct to say that you personally, or Mr. Hornsby,

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Sir T. BRADY.

[Continued.]

Mr. Seton-Karr—continued.

or any other inspector, grant exemptions?—No; it is incorrect.

6931. Will you kindly explain to the Committee exactly how that matter stands?—An individual inspector has no power to grant exemptions, or to do any act, in fact, without the assent of his colleagues. When an application is received by the inspectors of Fisheries from any proprietor or occupier of mills, the practice is for one of us to go down and inspect the place very carefully and hear what the local inspectors or head water bailiffs have to say; hear what the proprietors of mills or their managers have to say on the spot; and then the inspector who has made that inspection makes a minute or memorandum for the information of his colleagues. That may come to me first, or my other colleagues, as there are three of us, and we may dissent, as we have often done, one from the other from the proposition put forward by the inspector who has visited the place. In the case of some mills on the Bann river and its tributaries I dissented from my colleagues' recommendations, and at once both of us went down and inspected the place carefully, heard what each miller had to say, heard what the bailiffs on the spot had to say, and then we came to our own decision on the matter. Two, of course, is the majority of the three inspectors, and their decision settles the question.

6932. Does it ever happen that you are divided in opinion?—Yes, often; we are quite free to admit that.

6933. In a case where there is a strong difference of opinion you sometimes have a second examination, do you not?—Always. Where there was a difference of opinion I do not think we ever decide (I will say so positively) without two of us going down and inspecting the place. Then if we two decide that which may hereafter prove injurious to a mill, namely a refusal of exemption from a grating being put up at head or tail-race, and cause the miller to put it up, and any injury is caused, all the miller has to do is to call on us to hold a farther inquiry or represent what injury is done to him, and the three of us go down, we hold a public court of inquiry; we receive evidence on oath, not only from the milling side, but also from the bailiffs and others on the fishery side, and then the three of us form our judgment on the matter.

6934. Do you decide on the evidence brought before you by both sides?—Certainly. We have actually revoked a decision we had formerly made.

6935. On receiving fuller evidence?—Certainly; we did that from society that no injury should be done whatever to the milling interests of the country.

6936. You divide Ireland into three districts, I believe?—Yes, for convenience sake, amongst ourselves.

6937. But where a difference of opinion arises you all three visit the place wherever it may be?—There are two or three of us always. To clear up any misconception in the matter of dividing the country, I may say, that was done simply for convenience sake. My colleague very often comes to the district that has been allotted to me in the south of

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Mr. Seton-Karr—continued.

Ireland; I go with him to the north of Ireland, and so on. Two or three, perhaps, may go into one another's district. No single inspector has charge of any special district, so as to do any act of himself.

6938. Is there any case in Ireland that you are aware of where the miller has been called upon to maintain a grating after it has been proved to your satisfaction that the grating has injured him?—None whatever. If we compelled him to put up a grating, or rather refused an exemption to him, we have revoked our own order afterwards sometimes.

6939. Then not only is there no case of that kind, but further than that, where on insufficient evidence the exemption has been refused, on further evidence the exemption has always been granted?—Certainly, and in such a case the three of us agree.

6940. Then you are prepared to tell the Committee that this law has been most carefully and most judiciously administered, and if there is any doubt in the matter at all, and if there has been any partiality shown by you it has always been on the side of the millowner?—Most decidedly. I do not like to accuse our Department of partiality, or accuse myself of it, but I was always interested in the industry of the country, and if I leaned any way I leaned in favour of the millers.

6941. For instance, you might have a case where the head-race is a mile long. It would, I suppose, be difficult, perhaps, in that case for the millowner to send a man up all that distance at night to look after the grating. That, I take it, would be the case where you would take the facts into consideration, and exempt on that ground?—Just so; although really it was overstepping the actual letter of the law, because the letter of the law is that we cannot give exemption except when a grating interferes with the effective working power of the mill. But we, in our desire not to injure any industry, stepped beyond that, where we found that it might be very troublesome, and a very great hardship on the miller, to send his man up. In many cases I know that a miller would have to build a house beside his mill-sludge if we did not give him the exemption; and so we give him the exemption. In other cases, a mill-race may come in at right angles to a river; the great weight of water might be over the dam, and we take that into account also, and say, We will not harass the miller. If there be any hardship in the matter, we do not compel him to put up gratings there; we give an exemption.

6942. Can you mention a case to the Committee in illustration of that?—There are several cases in the north of Ireland; Mr. Webb's case, for instance, the moment we saw it; and also Mr. Dinmore's case.

Chairman.

6943. Do you say that the flow of the water was so direct over the weir that there was very little danger of the fish going into the race?—Quite so, and we took that into account; even assuming for a moment that fry or spent fish coming down the river would turn into the mill-race, there would be so few of them that we would not press the miller to put up a grating.

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6944. Do

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Sir T. BRADY.

[Continued.]

Mr. Seton-Karr.

6944. Do you make a strong distinction in cases where the mill does not take a large part, or the whole of the flow of a river?—Always.

6945. Have you ever directed a lattice-work to be put up at races of mills?—Never.

6946. What was the position of the millers up to 1869 under the law on that head?—With regard to gratings?

6947. Yes, and lattices?—With regard to gratings and lattices at their head and tail-races, they were exempted up to the Act of 1869; 5 & 6 Vict. c. 106, s. 78, exempted mills from the operation of that section; they were free from that; and then the Act of 1863 was passed, which had reference only to where turbines, or other hydraulic machines, were used.

6948. With regard to lattices, is it correct to say that your view was, that if you required lattices on races, it would interfere too much with the working of a mill?—Certainly. We have always felt that, and we have never compelled them to do it.

6949. And I suppose they had not at that time, or until very recently, discovered what was the best kind of lattices or gratings to be put up?—I think not.

6950. Probably they had not paid much attention to that view of the question?—I think not. Immediately after 1866 or 1869, when the Act of Parliament was passed, we consulted our engineer about it, and he drew out certain plans or diagrams for the consideration of the millers, to aid them and help them.

Mr. Tomlinson.

6951. What was his name?—Mr. Richard Gray.

Mr. Macartney.

6952. Of the Board of Works, is he not?—No, of the Fishery Department. We got these plans lithographed, and sent down to all the millers, and he suggested that this lattice-work should be put up.

6953. That is the class of lattice-work which we have heard of, is it not?—Yes.

Mr. Tomlinson.

6954. Have you a copy of that lithographed form?—No, I have not.

Mr. Seton-Karr.

6955. Can you have it sent to the Committee?—Certainly. Mr. Hornsby has these diagrams in town, and you can get them from him.

6956. As we are on the subject of lattices, I should like to direct your attention to that grating in the room?—I know it well.

6957. That kind of grating, I suppose, was not invented or thought of at the time you speak of?—It was not thought of till this year. That was invented by a very clever fellow in charge of the Cork Waterworks, Mr. O'Toole, an engineer. It was put up this year; and I have been there two or three times, and found that there is no obstruction whatever to the water.

6958. Have you seen it in operation?—Yes, I have seen it in operation several times.

6959. Then what you say with regard to

Mr. Seton-Karr—continued.

lattices does not apply to a grating of this description, does it?—No, not at all; that kind of lattice which has been produced here must stop the water. That lattice was put up at the Cork Waterworks, and caused an immense amount of trouble to the Cork Corporation engineers to keep it clean. They had to get two, like the sashes of a window, and when one got dirty another was put down before it and the other was hauled up and cleaned. All a man has to do now is to take a brush with a long handle and he can sweep it up and down without the slightest trouble. I saw it in operation myself.

6960. You were saying that you never imposed the erection of lattices on millowners; do you mean a lattice of that description?—Never.

6961. Had that kind of grating been thought of or invented I suppose the same remark would not apply; it would not have interfered with the water-power, would it?—I do not think even in the present day we would enforce that grating against millers in the head-races and tail-races. The Act of Parliament of 1863, which imposed upon millers where turbines were worked the duty of adopting an efficient means of preventing fry from entering the turbine, is what caused the lattice, not the gratings at the head and tail-races. These are two distinct questions which I am afraid from the evidence, as I have read it, have been rather jumbled up.

6962. I think I understand your distinction. You make the distinction between gratings at head and tail-races on the one hand, and the gratings at turbines?—Quite so; I want to draw that distinction. I do not think even at the present moment we would enforce that grating in any tail-race at all, and in no head-race would we enforce it, because the fry where bucket wheels or breast wheels are, would, generally speaking, go down pretty safely, and the spent fish also. Therefore we would not do it because it would give trouble to the miller.

6963. I think we understand the distinction you have drawn our attention to, but as I was asking you about lattices I wanted to have in passing your opinion on that grating?—I have seen it in work and it is most perfect, the water passing through it as level as this table.

6964. I suppose the reason why you would not impose lattices or gratings of that kind even at head and tail-races is that they are not required there?—They are not.

6965. It is only a question of keeping the full-grown salmon from going up the tail races for instance, is it not?—That is so.

6966. And the spent fish from going down the head-race?—Quite so.

6967. And also in those days there were hardly any turbine wheels; they were nearly all bucket wheels, were they not?—Yes.

Mr. Tomlinson.

6968. At what date are you speaking of?—Previous to the Act of 1863.

Mr. Seton-Karr.

6969. And up to 1869?—Increasing up to 1869.

6970. Do

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Mr. Seton-Karr—continued.

6970. Do you limit the period to previous to 1863?—Yes, and that was the Act that enforced the protection to these turbines.

6971. With regard to the turbine clause, when turbines came into operation did you consider the law imperative on millers to adopt efficient means to prevent fry from passing into them?—Certainly; I can hardly think there can be a doubt about it.

6972. And it is a protection that would only be necessary for two or three months in the year, is it not?—Two or three months at furthest; in many cases they are not required for three months, because, if there is a good fresh in the river, the smolts will all go down in much less time?—They would all go down safely to the sea.

6973. When once they begin to run they begin to go down very rapidly, do they not?—They do; you can hardly stop them.

6974. And the time of year for protecting the turbines would be when there was very little dirt or leaves or grass coming down the river?—Yes; April and May are the two principal months. Some fry may run in March but not many. The great body come down in April and May, and some probably in June.

6975. The time-head gratings are required at head and tail races, also the times of the year when salmon are ascending and descending, and times which are very well known, I believe?—Yes, and very short times also. That will depend altogether on the position of the mill in the river. For instance, as to mills, very high up stream (take the Maine river, for instance), the salmon ascending will only be seen probably two months out of the twelve going up, and that is all the time that is required to keep a grating at the tail-race to prevent them getting in. Then, on going down, it will be only a very short time, say a month or two, that they would be required to have them at the head-race; all the rest of the year is free.

6976. Although the periods may vary in different rivers, in each locality the period is perfectly well known, is it not?—It is perfectly well known, and, in any exemptions we give, we adopt our exemption exactly to the time of year when salmon are or are not in that locality. We would not make one general exemption for the whole river, because in one part of the river the salmon are up earlier, and so on, as you get up.

6977. You adapt your own exemptions to the knowledge of the times when the fish are going up and down, do you not?—We do.

6978. Was there not a case quite recently in the north where you directed gratings on the tail-race of a mill for a short time, and found that it caused a backwater which injured the machinery?—Yes, I heard that only the other day, when I was down soaking some experiments by the authority of this Committee. The manager of the mill told me, when I asked him if he had anything to complain of, "No, nothing whatever, except that you last winter caused us to put up gratings for a couple of months to prevent the spawning fish getting into the tail-race, and the flow came and threw back-

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Mr. Seton-Karr—continued.

water on us, and some of our machinery broke and it cost us some money."

6979. What mill was this?—Mr. Gilson's mill at Lissafellan. I told him his remedy was to represent that to the inspector of fisheries, and the three of us would go down, hold an inquiry, and receive evidence, and of course if the evidence bore out what he stated to me, we would give the exemption.

6980. You yourself told him what his proper remedy was in that case, did you not?—Certainly.

6981. Do you think there is any hardship thrown on millowners by the Act of 1863 relating to gratings?—None whatever. By the way in which it has been worked, it is utterly impossible there can be any hardship except that, of course, of keeping the gratings clean for a very short time. That is, speaking of the grating clause.

6982. What is the reason, then, that some of them make complaints?—I candidly say to the Committee I do not think there would have been any complaints whatever, but that Mr. Webb in the north of Ireland was summoned and made a criminal of (as he said himself) before his own bench of magistrates. He would not put up gratings; the bailiff called upon him to do so by direction of the board of conservators; but he neither would put them up nor apply for exemption; and, as a matter of course, he could not be made an exception to the law, and the board of conservators prosecuted him, and he was fined.

6983. I will ask you to give us the facts of that presently; but is it not the fact that the millowners sometimes will not take the trouble to clean the gratings?—It is the fact; over and over again we have seen that.

6984. They will not take the trouble to do it, will they?—They will not.

6985. Do you think that is the chief reason that complaints have been made with regard to this grating clause?—I have not the slightest doubt about it.

6986. In fact, are you prepared to say that is the main reason?—I think it is the main reason.

6987. In other words, if the millowners took the trouble to clean their gratings properly we should hear nothing about the mills being interfered with, you think?—Nothing whatever. The fact is, on a late inspection (I cannot remember the name of the mill, but I can refer to it in my note-book for the time) I saw the grating of one mill was thick with weeds and dirt, and I spoke to the manager of the mill and said, "Why do you not keep that clean for your own sake?"

6988. Where was that?—In the north; I do not remember exactly where it is at the very moment, but I am sure I could find it out from my note-book. I said to the manager, "Why do you not keep that clean?" he said, "Oh, it does not matter; it does not throw any backwater on us." I said, "Even for appearance sake you might keep it clean."

6989. He found he was not troubled, and he would not trouble himself to keep it clean?—Quite so; it did not throw any backwater on him, although the dirt attached to the grating lifted the water much higher at the back of it than it was at the front of it, as it went down.

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6990. I suppose

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Mr. Seton-Karr—continued.

6890. I suppose if it had injured his machinery he would probably have blamed the grating?—Probably he would.

6891. Are you prepared to say that in your experience there have been many cases where the trouble arose because they would not keep the gratings clean?—We have over and over again seen it ourselves.

6892. Those gratings that we are speaking of, namely, the gratings to keep full-grown salmon and spent fish out, are gratings which are very easily cleaned, are they not?—Very easily. They are only vertical bars, two inches apart.

6893. The trouble you spoke of with regard to the lattice has nothing whatever to do with the gratings you are now speaking of, has it?—Nothing whatever.

6894. Before I go to the details of Mr. Webb's case, I will ask you a question with regard to the poaching that is done in mill races, and the works appertenant to mills. This has always been a subject of reference, I believe, in all Acts of Parliament, has it not?—I have gone back to 1824 for references which I am prepared to bring before the Committee if necessary; and all Select Committees of the House of Commons, and all Commissions of Inquiry, have reported on this source of destruction to the salmon fisheries of the country; that is not more so with regard to Ireland than to Scotland.

6895. That is one of the natural consequences of the erection of a mill, is it not?—It is.

6896. And it is not greater now than it was 20 or 30 years ago, is it?—Oh, no.

6897. I suppose it is almost impossible to protect mill races in a way from poaching?—In some cases it requires men employed night and day to protect them. I have seen myself, in the South of Ireland, a race absolutely full of salmon, and you could not get those salmon out of that tail-race.

6898. Was that in Galway?—No, that was in the county of Limerick; and any one can see them in the present day. When the summer fish are running up in Galway, I have seen a tail-race literally paved with salmon, and when the wheel stopped you could hardly drive them out of the tail-race. Even with the little waste of water coming through the wheel, still their noses were pushing on trying to get up; and you could hardly drive them out. I should think there were four hundred or five hundred salmon, some of them 20 lbs. weight, which anyone could take. They have to be watched night and day; and I believe that was the origin of the clause in the Act of 1869.

Mr. Macartney.

6899. Do you say it was the origin of the clause?—I believe the origin of the clause was that Galway case.

Mr. Seton-Karr.

7000. Is that the grating clause?—Yes; that is the grating clause.

7001. These facts you mention, of course, are very strong evidence of the necessity of gratings at the time salmon are running up or down the river?—I do not think any impartial person would say there is no necessity for them.

Mr. Seton-Karr—continued.

7002. In view of the fact that Acts since 1824 have taken notice of this danger to fish, I suppose it is not correct to say that poaching of recent years has increased at all?—I do not think poaching has increased since 1848, when the law first began to be administered, and when funds were provided for the employment of bailiffs. I rather think it has decreased. Probably it increased for some time, but of late years, according to all the reports we receive, it has been diminishing very much. The police have been very active and given us great help in the matter.

7003. Taking the last 10 years; in cases where the supply of salmon in rivers has decreased largely, is it in your view correct to say that it is due to poaching?—Certainly not. It is very hard for me as a Government inspector of fisheries, only occasionally visiting a river, and only going down when the necessity requires it, to know what poaching is going on at night. I must depend on the reports made by the Boards of Conservators to our department, and they get their reports from their own officers. There is a better class of officers at the present day, particularly in the north of Ireland, employed now than there used to be. I do not say there is not plenty of poaching, and always will be, to the day of judgment, I suppose, for salmon.

7004. Still, the point is, in your opinion, it has not increased?—Certainly not, I think poaching has very much diminished.

7005. A fish-pass would not do much good, I take it then, in a case where a mill-race takes most of the flow of the river?—Hardly any good at all, until the water rises a certain height over the apex of the weir. There are numbers of people in Ireland who would provide money (and I may say that in England it is the very same thing) for the building of fish passes, but the miller steps in and says, "You may build your fish pass or fish ladder, whichever you like to call it."

Mr. Macartney.

7006. There was a great distinction made between the two by Mr. Munn; and I want to know which it is properly called. Will you describe to us the difference between a fish ladder and a fish pass?—There is no difference.

Chairman.

7007. I certainly understood from Mr. Munn that a fish ladder was the means by which a fish ascended the river, and that a fish pass was the means by which it descended the river?—I think, if you examine Mr. Munn's evidence, he rather wished to draw that distinction between fish passes and ladders, so that you might know that what he meant when he was talking about a fish ladder was a pass built on the apex of the weir, but not going into it at all.

Mr. Tomlinson.

7008. I understood Mr. Munn's distinction to be this: That a fish ladder was a series of steps by which fish could get up to the level of the top of the weir?—We have no such thing in the words of the statute at all as a fish ladder. I may say with regard to a fish ladder it is, as you say, breaks or steps in a pass, as we will call it at present;

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Mr. Tomlinson—continued.

present; that is merely to concentrate the flow of water and prevent it getting away too rapidly. When that plan of pass was introduced it was introduced into England by a very celebrated Irish engineer, who designed fish-passes that were very effective in Ireland, so far as Galway and Ballisodare were concerned, and made Ballisodare river a very valuable salmon fishery. When they were introduced into England, and the English people, under the Act of 1851, took an interest in protecting salmon fisheries, they were called ladders here. That is the origin of the words "salmon ladders." You never hear of such a thing in Ireland.

7009. Am I correct in understanding Mr. Munn in this way: that there are two things; one, a series of steps by which fish can get to the top of the weir; and another, a depression in the level of the weir to enable the water to flow more easily over it?—No, there is no distinction. As I read Mr. Munn's evidence, and as he referred to a fish-pass, he meant that a fish-pass and a queen's gap were analogous terms; but you could not put a fish-pass so as to correspond with a queen's gap in a mill weir, because if you did you would ruin the mill altogether. You would get right down through.

Mr. Macartney.

7010. Queen's gaps were confined to fishing weirs?—Yes.

7011. But when you are speaking of a fish-pass you mean the pass or ladder that can be applied to mill dams, do you?—Quite so.

Mr. Seton-Karr.

7012. The fish-pass or ladder applies to mill dams, and the queen's gap to a fishing weir?—Yes.

Mr. Picken.

7013. Will you refer to the evidence of Mr. Munn on page 242, Question 6574?—I do not think there is much difference after all between Mr. Munn and myself. He says: "Fish ladders are erections placed on the outside of the weirs for the damming back of water for mills." Now he is dealing with it from a legal point of view: "Fish-passes are passes that are put into fishing weirs for the purpose of allowing a certain number of salmon at any rate to pass up for the purpose of breeding; they are what are called queen's gaps."

Mr. Macartney.

7014. He distinctly confined in his evidence the word "pass" to a "queen's gap;" but you do not, as I understand?—Certainly not; and I can point out to you if necessary the sections of the Act of Parliament which shows the difference between a fish-pass and a queen's gap.

7015. You are using the word in a wider sense than Mr. Munn did?—You cannot fish within a certain distance of a queen's gap; and there is no prohibition as to fishing with a certain distance of a fish-pass.

O.B.

Mr. Seton-Karr.

7016. With regard to fish going up for spawning purposes, it is only when the instinct comes upon them to go up that they will take a pass and go over the weir, is it not?—That is so. I think we have two celebrated instances in Ireland of that. We have at Galway a very large regulating weir, which runs across the entire weir at Galway and divides down to two very wide channels, feeding mills all down its course. In that regulating weir is a fish-pass, built originally by the engineer I mentioned, Mr. Forsyth; and this is a most effective fish-pass. I have seen the fish go over that like race-horses jumping over one another when once they take it into their heads to go. Perhaps the day before (although there is always plenty of water in that fish-pass, because the commissioners who built the weir left a large cut in it below the apex of the weir), I do not exaggerate when I say at any time in the month of August you will see 2,000 or 3,000, perhaps 5,000 fish lying below, in what is called the drain. If any of the Committee are in the habit of visiting Galway during the angling season they would say I do not exaggerate when I say you can see at least 3,000 salmon there.

Mr. Tomlinson.

7017. Can you describe the construction of that pass?—It is the ordinary fish-pass. There is a gap in the weir like that; it is cut down about two feet deep, and then there are these breakers coming from side to side, and the water comes in here, and runs like that (describing).

7018. Then it causes a loss of water at the head, does it not?—Yes, it would cause a loss of water; of course it must do so; but it was built at the time the Commissioners of the Navigation were carrying out works for the purpose of carrying out the drainage and navigation operations with reference to Lough Corrib. They had power to depress it there, but there is such a great width of river that there is sufficient water maintained for the mills.

Mr. Seton-Karr.

7019. The point you were impressing on the Committee was, that even with the best constructed fish-pass, and plenty of water in it, the fish will not always take it unless they are so inclined, until the time comes for them to ascend the river?—Certainly. I instanced Galway and also Ballisodare. At Ballisodare Lord Enniskillen took out 300 fish on one occasion from one of the pools of the ladder. He did not kill them, of course, he put them back again. Below this ladder large draughts of salmon are taken. They are waiting there, but what the instinct is no one knows.

7020. With regard to the protection of fish in and about the appurtenances of a mill, it does not follow that the erection of a good fish-pass at a dam would do away with the necessity of protecting the fish, does it?—Certainly not. On one of the rivers I know, the River Annacotty, there is a relay of half-life in the season day and night, and an excellent fish-pass has been built in that weir. The miller gave us permission to depress a portion of the weir. Taking that as the apex of the

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the weir, we cut it so, and built the pass like that (illustrating). The weir was depressed at one end and the fish-pass built there, and a very good fish-pass it was.

7021. Where was that?—At Annecotty, on the Mulken river. The tail-race comes out like that (describing), and this tail-race takes all the fish; and a relay of bailiffs is kept there day and night in summer watching them.

7022. Did that fish-pass interfere with the flow of water to the mill at all?—No. I would not answer that positively, because the millowner was exceedingly kind and gave permission to make the depression in the dam. As a matter of course, when the water falls very low it takes that quantity of water from the mill.

7023. You never heard any complaint about it, did you?—No, the owner of the mill consented to it.

Mr. Toolinson.

7024. Is there any grating at that tail-race?—No; a grating was put up in that tail-race, but it was found it would not answer, and it was taken away, and now the Conservators have nothing to do but to watch it.

Mr. Seton-Karr.

7025. Do you consider a fish-pass a necessary thing?—Very important.

7026. The point that you are making is, is it not, that the existence of a fish-pass does not do away with the necessity of protecting the head and tail races?—Certainly not; it cannot unless you have the power of cutting down into the weir and taking so much water from the mill, which never was sought for on any occasion. Then you could build a fish-pass that might be of use; but you would injure the milling interest by taking so much water away.

7027. Whether there is a fish-pass or not, the necessity of having gratings at head and tail races at certain times of the year still remains?—It must remain.

7028. As a matter of fact, do you think that the law with regard to fish-passes requires amending?—Yes, we are in a very unsatisfactory state with regard to the law as to fish-passes. The Act of 1842 provides that in any old weir, erected before the Act of 1842, the Commissioners of Fisheries would have power, on money being provided, to build a fish-pass. As I have explained to the Committee, that fish-pass would be virtually useless unless you could go below the apex of the weir, because you have a thin volume of water, and only the same quantity running over the whole weir, all being on a level. Then the Act of Parliament provides that in any new erections, placed in rivers since 1842, the person who places them should build a fish-pass in such a way as we may direct, and should always have a constant supply of water flowing through it. There was no penalty provided in that Act for not doing it, and the consequence is that it is a dead-letter. I went as far as anyone could do in my fishery capacity and represented the matter to the Law Officers of the Crown in Ireland, and we brought a case before the Court of Queen's Bench at my suit; but the judges decided that it was a case for an indictment, which

Mr. Seton-Karr—continued.

means that no one will undertake it. The gentleman who owned it was indicted; and the grand jury threw out the bill.

7029. Then do you agree with Mr. Muen's evidence on that point?—Entirely. I think that law is in a most unsatisfactory state, not only for the fishing interest, but for the milling interest. A miller has no right to be put to the trouble of being indicted. If he raises the height of the old weir so as to form a greater obstruction, he ought to know he will be fined for it, or that he must build a fish-pass. Now he can do it with impunity, except that he is subject to an indictment, which is a very awkward position for a gentleman to be placed in. If he is found guilty of a misdemeanour, which he would be if the grand jury found a bill, and the petty jury found him guilty, the judge might fine him 500 £, or send him to gaol, which would be a very serious thing.

7030. Then do I understand that you consider the law most unsatisfactory?—I consider the law most unsatisfactory.

Mr. Macartney.

7031. Do I understand you to say there is no process at all except by indictment?—No process at all; that is, as to the new erections I am speaking of.

7032. I thought you were referring to fish-passes now?—Yes, I am dealing with fish-passes in new erections; that is, erections placed in rivers since 1842.

7033. Do you distinguish that from fish-passes on old mills?—Yes, there are the two classes.

Mr. Seton-Karr.

7034. And under the present law, I take it that a miller can raise his dam as a matter of fact without putting in an efficient fish-pass, can he not?—Not legally; really he cannot; but the only remedy against him is by indictment.

7035. Then it amounts to that practically, does it not?—It does.

7036. From the evidence you have already given, I suppose if dams were erected in many cases in that way it would prevent the salmon in some cases from ascending the river altogether?—It would be very injurious to the salmon fisheries.

7037. Would it take away a large amount of spawning ground?—You can very easily understand, when a lot of salmon congregate below a weir, and there are no means of getting over, when they are trying to ascend to the spawning ground they will either die or be poached there; and it is impossible to watch them always.

7038. Do you think that any proposed legislation now should contain some provisions on this point?—Certainly. We have recommended that in several of our annual Reports to Parliament. I think there are a great many amendments that could be made in the fishery laws, and I have a strong opinion they should be taken up by the Government; and we have so recommended in our reports to Parliament from time to time.

7039. Have you seen many fish congregated below the weir in the River Lee?—Yes, they have

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have two fish passes in that weir in Cork, and they have a very peculiar contrivance for getting the salmon out of the tail-race there. The whole of the water of the Lee goes down through turbines to supply water to the city of Cork. It is a very long and deep tail-race, and very wide, in fact, I think 70 to 80 feet wide; and the ascending fish go up there, and you will see them in vast numbers immediately below the turbines. They are perfectly safe there so long as they are watched by the bailiffs, and all that kind of thing. Then they have a sluice on the right bank, and when they stop the turbines they open that sluice, and the moment the fish feel the draught of water there, they take it and shoot into the river. Then although there are good fish-passes in that weir, you will see them jumping at the weir trying to run up, and being beaten down again until they find the foot of the ladder or fish-pass.

7040. Do you say there is a sluice at the foot of the turbines between the tail-race and the river?—Here are the turbines (*describing*), and there is a sluice here. Here is the turbine house. This is the weir and this is the river running down. The fish all run up here and congregate here. They have a sluice here and here. When the fish congregate here they stop that sluice, that sluice shuts the water off the turbines, they open this sluice, and the moment the shoot of water is felt by the fish the fish take that water and get into the river.

7041. There are a couple of fish-passes in the dam, are there not?—Yes, there is one at that point and another in the centre. It is a very ingenious contrivance, but not satisfactory. Unless you had the people attached to a mill or water works like that cordially co-operating with you in the protection of the fish, you would find it very difficult to get the fish out of the tail-race.

7042. The owners of the Cork Waterworks put in that sluice and that contrivance, I suppose, of their own accord?—They did. The Cork Corporation, I must say, have done everything most cordially and are most anxious for the protection of the fisheries, while at the same time observing their own rights. Their works are probably the largest in the kingdom, so far as turbine works are concerned.

7043. And they have found no difficulty whatever, I believe, in combining the protection of fish with their working of the turbines?—None whatever; all their officers have got instructions to do so.

7044. I wish to ask you a few questions about Mr. Webb's prosecution, to which you have alluded. You say that the clause in the Act of 1869, which practically brought mills under the operation of the Act of 1812, was never complained of until Mr. Webb was prosecuted by the officer of the Board of Conservators?—Never.

7045. In what year was that?—1890.

7046. Will you kindly explain to the Committee exactly what happened on that occasion with regard to Mr. Webb's prosecution?—I can only tell it from Mr. Webb himself.

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Mr. Pinkerton.

7047. You do not know anything about it yourself, do you?—I know what Mr. Webb informed me. I know that Mr. Webb did not apply for any exemption until after he was convicted.

Mr. Seton-Kerr.

7048. In the first place, Mr. Webb was more indignant at the idea of being summoned, was he not, than he was at the idea of being compelled to put up any grating?—Certainly. He told me he was made a criminal of before his own bench of magistrates, his colleagues.

7049. You spoke to Mr. Webb yourself about this matter, did you not?—Yes, I went down with my colleague, Mr. Hornsby, as we had a difference of opinion on the subject of these gratings. We received an application from Mr. Webb for an exemption, I think, in March 1891, when he wrote to us, and said that a further communication setting forth the grounds of his application would follow, but that further communication never followed. He never wrote to us. However, we were informed by the Board of Conservators that Mr. Webb was being prosecuted, and we went down, I think, early in May 1891, and saw Mr. Webb, and saw the bailiffs; and Mr. Hornsby and I, after hearing both sides, agreed that Mr. Webb was entitled to exemption from gratings both at head and tail-races, he having been previously convicted for not putting them up. Had Mr. Webb applied for exemption, the probability is, he would have got the exemption before being summoned. However, we gave that exemption, and there were some other cases pending against him for the same offence, or for offences on other dates. Mr. Hornsby and I considered that was really pushing the law very far, to say the least of it, and that it was not very judicious on the part of the Board of Conservators; and as Mr. Webb feared that the Board of Conservators, and stated to us positively, that the Board of Conservators would proceed against him for the penalties for the dates on which he had not put up gratings before our exemption, we said, "We will make our exemption retrospective," although we had no power to do so, and we had no power to bind the magistrates. They might have said, "we will not mind what you say"; but at the same time we thought the magistrates would take it into account when they saw that, and we did it for the sake of harmony and peace, and for the welfare of everybody.

7050. Then you exceeded your powers in favour of Mr. Webb in that case, did you not?—We did.

7051. As a matter of fact, he might have avoided all this litigation by applying in proper time for an exemption, might he not?—Quite so; and I thought it was only just to do as we did to Mr. Webb, though we even exceeded our powers.

7052. Rather than put him to any inconvenience you exceeded your powers, and made your exemption retrospective?—We did, though I doubt the legality of it.

7053. But you did it, at all events, did you not?—We did.

7054. I think there is a bye-wash in Mr. Webb's head-race, is there not?—There is.

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7055. And

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[Continued.]

Mr. Seton-Karr—continued.

7055. And a considerable weight of water goes down over the dam, does it not?—Yes, and that was one of the reasons why we gave exemption. We took into account a good many reasons for giving Mr. Webb exemption, as we did in other cases. With regard to his tail-race, I may say his tail-race discharges through Lord O'Neill's demesne, and it is overshadowed with trees for a long distance, so we thought it would be very difficult for Mr. Webb to keep the gratings clean, even for the two or three months that the spawning fish would be ascending, and we gave an exemption in consequence of that, though I doubt if we had power to do so.

7056. And also he would have had to go on to another man's demesne to erect the grating, would he not?—He would. Of course I do not know whether he has a right to do so or not.

7057. Has he a lease of that demesne, do you know?—I do not know anything about that.

7058. However, you took all those things into consideration, did you?—We did.

7059. Was there any personal quarrel, do you think, between Mr. Webb and the local inspector?—I am sorry to say it was too evident, on the bank of the river.

7060. Very possibly all this trouble arose through those special facts?—I have not the slightest doubt about it; and not only that, but it is the opinion of every one I have spoken to in that part of the north of Ireland.

7061. Without imputing blame to anybody, there were special facts here, I take it, which account, in fact, for all the litigation and disturbance?—No doubt about it; I find there was a want of judgment on both sides. I think there was a want of judgment in issuing so many summonses against Mr. Webb, at any rate till the Board of Conservators got our decision. Bad blood was engendered by it, and angry feeling, and the result is that you gentlemen have had this matter before you.

7062. By your judicious action in overstepping discreetly your powers you settled the whole thing; did you not?—I thought I would; but I am sorry to say I was not successful.

7063. There was no more trouble, so far as Mr. Webb was concerned, was there?—None whatever; and individually, so far as I am concerned, I may tell you there is nothing, as a fishery inspector or otherwise, that I would willingly do that would injure any industry in the country.

7064. After the passing of the Act of 1869, I believe you issued circulars to every board of conservators in Ireland asking for a list of the mills in their district?—We did. I can put in a copy of the circular we issued and the notice we issued. This is a circular we issued in 1869, immediately after the passing of the Act of Parliament, signed by myself and my colleague, who is now dead, Major Hayes. There were only two permanent inspectors then. This is directed to the clerk of the conservators of every district in Ireland: "Sir,—By the provisions of the Act of Parliament passed this Session, it is incumbent upon the owners or occupiers of all mills or factories using water from rivers fre-

Mr. Seton-Karr—continued.

quented by salmon, as a moving power for machinery, to place gratings and lattices at the points of divergence from and return to such river of any channels, sluices, watercourses, &c., under a penalty not exceeding 10*l*, except such cases where it may be proved to the satisfaction of the inspectors that the fixing of such gratings or lattices would be injurious to such mills or factories, and they may by them be specially exempted from the operations of the Act. We therefore request you will be good enough to furnish us, with as little delay as possible, with a list of all the mills or factories in your district, and such other information connected herewith as you may have." On getting that list we issued, early in 1870, this notice: "To Owners, Lessees and Occupiers of Mills and Factories," calling their attention to it. Then we re-issued the notice in 1890, when this complaint arose about no gratings being put up.

Mr. Macartney.

7065. Is that the turbine notice?—No.

7066. Did you issue another besides the turbine notice?—I think so.

7067. The one issued in 1890 was distinctly a turbine notice, was it not?—I think we issued two. I am dealing now only with the grating notice. I have not touched the question of turbines up to the present.

Mr. Seton-Karr.

7068. This was issued, was it not, in the early part of 1870?—Yes; then it was re-issued in 1890; we only quote the Act of Parliament in that notice.

Mr. Tomlinson.

7069. The Act of Parliament does not require a lattice, does it?—Yes; the 5th and 6th Victoria, the 1842 Act, does. If you will allow me, I will explain it shortly in a few words.

Mr. Macartney.

7070. The provision as to lattice was contained in the 1842 Act, and this notice only refers to the 1842 Act, does it not?—That is all.

7071. It does not refer to the Turbine Act at all, does it?—No. I have the other notice.

7072. When do you say this was re-issued?—In 1890.

Mr. Seton-Karr.

7073. What is the other notice you have?—This is the turbine notice which was issued in 1890.

7074. Did you issue this notice as to lattice in the early part of 1870?—Yes.

7075. And did you re-issue identically the same notice in 1890?—Yes.

7076. I believe you wish to refer to your reports for the years 1870 and 1871 on this point?—Yes; I would like to refer to them to show what our opinions were.

7077. Are you now speaking entirely of the gratings clause?—Yes, entirely. In our report for 1870, we say this: "By the 32nd and 33rd Victoria, chapter 9, it is enacted that the exemption

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exemption from compliance with the provisions of the 76th section of the 5th and 6th Victoria, chapter 106, which requires that gratings shall be placed in water-courses leading the water to and from mills during the ascent and descent of salmon, and lattices during the descent of fry, shall extend only to such cases in which, and for such periods during which, it shall be proved to our satisfaction that such exemption is necessary for the effective working of the machinery. This imposed on us a work of more than ordinary labour, care, and attention. The mills are numerous in the country, the trade is a very close one, in the majority of cases little profit arising, and they are most important resources of the country which should not be lightly considered even for the advantage of the fisheries. It became, therefore, our anxious desire that while we were doing all in our power for the protection of the fish, we should not do anything to cause injury to the milling power of the country. The erection of lattice work would have caused in most cases a serious injury, and we have not enforced it, except in cases where turbines are used, and the law is peremptory in this respect. With regard to gratings, we have given exemption in every case where it was proved to our satisfaction they would have been injurious to the effective working of the mill, and we are not aware of a single instance of having compelled their continuance after they had been put up, when injury was proved. We can now, therefore, state that, notwithstanding all the outcry against this clause, no injury has been done to the milling power, while it has proved most advantageous in many cases to the fisheries." That was the first report we made after the Act of 1869 was passed.

Mr. Macartney.

7078. That was the one presented in 1871, I suppose?—Yes; this was the report for the year 1871.

Mr. Seton-Karr.

7079. The same year, in the early part of which you issued this notice you have referred to?—Yes.

7080. Then I think you wish to refer to a paragraph in your following year's report, do you not?—Yes; in our report for 1871, which was issued in 1872, we say at page 14, "Mills and Gratings. As we anticipated, the great outcry raised against the clause, in the 32 and 33 Victoria, chapter 52, which required gratings to be placed on mill-leads and tail-races, except where we granted an exemption, has subsided. Millers have seen that we have been most careful only to enforce the provisions of the Act when it could be done without injuring their water power; and whilst the clause has proved in many cases to be most valuable to the fisheries; we have not, by too stringent enforcement of it, in a single instance caused damage to the milling interests. Designs for gratings and lattices have been prepared by our engineer, and we have supplied them to all persons interested where gratings were required to be erected." These are the diagrams

Mr. Seton-Karr—continued.

that I referred to before. And you will perceive that though our engineer made these diagrams for the purpose of putting them up to prevent the descent of fry, we never in a single instance asked a miller in the country to put up these lattices in tail-races or head-races. We say in our report that we did not enforce it and would not enforce it.

7081. That is to say, you freely exercised your power of exemption?—Certainly.

7082. What do you think of the repeal of this section of the Act of 1869 by the proposed Bill of Mr. Macartney?—I think it will be most injurious to the fisheries.

7083. Will you very shortly tell us your reasons for that view?—Of course the Bill as it stands repeals the only safeguard that we have from preventing spawning salmon from going into tail-races, and it repeals also the only provision we have to prevent salmon descending from going in; and if you repeal that in many cases in Ireland you will have an enormous destruction of spawning fish, which is an important thing. By destroying your spawning fish you would very soon extinguish the salmon fishing industries of the country, and they are too valuable to be thought of lightly at the present time. They are producing about 600,000 l. a year at the present moment. We have returns from nine markets in England, which appear in our report of 1880, from which alone we got over 350,000 l. Then look at the employment it gives to the poorer classes of the people during the salmon fishing season months, which is very large indeed; taking it on a most moderate calculation you have at least 10,000 people employed.

Mr. Macartney.

7084. Do you include the people who are boat fishing in that?—I include all fishing boats, weirs, stake weirs, bag nets, and everything. I am speaking of the labourers who are employed, not of the anglers; I may leave them out.

7085. Do they all appear in the return presented to Parliament?—You will find them in the report for 1880. The actual number of people employed, I think, is 12,200, speaking from memory. Then, if you deduct the number of anglers and the number who fish eel nets, the number of workmen actually employed in salmon fisheries comes to about 10,000.

Mr. Seton-Karr.

7086. In other words, there are 10,000 men at least, are there not, who are dependent for their livelihood on this industry?—Yes.

7087. Are you speaking of the whole of Ireland?—I am speaking of the whole of Ireland. While I am upon that point I would say this: In addition to that, the loss to our country would be very great. We have a great number of gentlemen who come over from England who spend large sums of money in angling in different parts of the country; the hotels are kept up, and a large amount of employment is given by these gentlemen and everything of that kind. We should lose all that if our salmon fisheries were injured.

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Mr. Seton-Karr—continued.

7088. All that money goes into the pockets of Irishmen, and rightly so, does it not?—That is so. It is a large amount. Look at some of the rents for some of our fisheries for angling purposes alone. It is something enormous on the Shannon. I think they are getting 800*l.* a year for one fishery.

7089. Do you say with a full sense of the importance of the milling industry that you are strongly opposed to the repeal of this grating clause?—I am very strongly opposed to it, and I beg the Committee will distinctly understand from me that I am opposed to it on public grounds and in the interests of the poor public fishermen. I do not enter into the question with regard to the proprietors of fisheries. They are able to speak for themselves; I speak utterly independent of them. I speak of the poor fishermen who, in the South of Ireland and elsewhere, may be seriously injured; these are the men whose cause I advocate, and who would be very seriously injured.

7090. There is not the slightest necessity to sacrifice the one industry to the other is there? None whatever; it only requires a little give and take, and both industries may be carried on to the advantage of the country; but if you get two emperors who will go to war, and who will not arbitrate except by the sword, you know what the result is—thousands are killed.

Chairman.

7091. Thousands of salmon?—Thousands of lives are lost; and in this case thousands of salmon would suffer, and the country would suffer.

Mr. Seton-Karr.

7092. You have no desire to injure the milling industry, I take it?—Directly the contrary; and there is not a millowner in Ireland who would accuse me of it, that I am aware of. And what is more than that, I rather got a character amongst the fishery people that I was too partial to the mills. Many thought I was leaning too lightly on the miller, but I did not mind that; I was doing what I felt to be in the interest of both parties, and what I felt to be for the benefit of the interests of the country.

7093. Millowners have spoken of their grievances under the present law. As a matter of fact, are they or are they not being injured by the operation of the present law?—They are not injured by the operation of the present law. I am confining my observations altogether to the question of gratings up to the present. I will deal with the question of turbines afterwards.

7094. I think there was one other report that you desired to refer to, namely the report of the inquiry by Buckland?—Yes, I have that report.

Mr. Macartney.

7095. Is that the 1861 report made by him as special commissioner for England and Wales?—No, it is the Scotch salmon fishery report that I referred to, made by Mr. Buckland and Mr. Young. It is a report of 1871 on a special commission, which was issued by the Home Office. On page 15 the report deals with the question under the head of "natural and artificial obstruc-

Mr. Macartney—continued.

tions; whether the existing provisions in regard to weirs, cruives, or natural or artificial obstructions to the passage of fish be sufficient." Then he says: "One of the most important elements of success in the cultivation of salmon rivers is that weirs to mill-lades should be properly guarded, so that fish should not be destroyed or injured by water-wheels."

Mr. Tammison.

7096. What is a "hook"?—It is a Scotch word; it merely means a grating. The report goes on: "In the spring of the year, salmon in two stages of growth are found descending the rivers, 1st, the parent fish which have recently deposited their ova, and are then in a sickly condition, but which will eventually return as valuable property; 2nd, the smolts which have hitherto lived in fresh water, and which are then descending to the sea, whence they will return as grilse, and subsequently as salmon. With these facts before us, it is clear that the destruction of the above two classes of fish must be highly detrimental to the increase of the number of salmon in the rivers. The descending fish (whether young or old) meet in their downward course." He states then, "In the case of over-shot wheels and bucket wheels, the smolts may generally escape injury, but in the case of turbine wheels, there is no escape for them. The most marked instance of this that came under our personal observation was at Ashfield Blenelwork, on the river Allan, above Dunblane. There is a turbine-wheel there, and we found the bottom of the turbine-wheel whitened, so to speak, with dead smolts. We collected between 30 and 40 of them in a few minutes. They were quite fresh, and had evidently been just killed. The turbine-wheel had in some cases taken off the heads, in some fractured the spine in many places, and in others crushed the fish almost to jelly. We understood that this destruction had been going on for some days previously to our visit, which was at the height of the migrating time of the smolts."

Mr. Seton-Karr.

7097. What river was that?—The river Allan at Dushlavy.

7098. Does it say what kind of turbine that was?—It does not say.

7099. The law of Scotland requires millers to put up gratings at their own expense, does it not?—Yes.

7100. Do you think that is a very good example for the Irish law?—I think so. Our salmon fisheries are nearly treble the value of the Scotch fisheries.

7101. What would be the expense?—That would be a mere nothing. I never heard of a miller complaining of the expense.

7102. We have had evidence here that it would cost a large sum of money, something like 1,400*l.*?—I think that was for the protection of the turbine.

7103. Do you know Mr. Webb's mill well?—I do.

7104. He describes the nature of the work which he conceives he would be obliged to do if

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he obeyed the directions of the Board of Conservators; and he also says at Question 120 that those erections as he would be required to make them would cost him 1,400*l.* out of his own pocket; what is your opinion with regard to that?—I am not an engineer.

7105. As a practical man what do you think of it?—I do not like to contradict Mr. Webb or anybody about it, but I am quite clear upon this. I have read this evidence all through, and I think you will find I am not incorrect when I say that Mr. Webb included the loss he would sustain by the stoppage of his mill.

Mr. Hayden.

7106. I understood him to include the loss?—Yes, that is so. I have read the evidence carefully.

Chairman.

7107. I think you are quite right. At Question 132 Mr. Webb says: "I mean to say the loss would have cost me that. I should have to stop my work?"—Exactly so. I read it that it included the loss. I really think it is not fair for me, not being an expert, to give evidences of what it would cost to put up. But the gratings, in most cases in Ireland, would cost exceedingly little; a few pounds at the very most.

Mr. Seton-Karr.

7108. You do not think, do you, the expense is a material point at all?—I never heard a miller, even when he was refused an exemption, complain of the expense of putting up a grating; it was always the trouble he complained of.

7109. But you say you never heard a mill-owner complain about the expense?—No, I never did.

7110. Mr. Hassard told the Committee, in answer to Question 4758, that he did not think the expense Mr. Webb would be put to would be more than 100*l.* at the outside, to cover everything necessary. In regard to the time it would take he said he would undertake to do it between Saturday and Monday?—I think that is a very extreme view. I do not think he could do it between Saturday and Monday.

7111. At all events the question of expense, as you say, has never been complained of to your knowledge?—Never, until I heard of Mr. Webb complaining of the expense before this Committee.

7112. I believe, in your capacity of inspector, you have had a good many questions on the subject of gratings put to the numerous boards of conservators in England?—Yes.

7113. Will you produce the abstract of the replies?—I have an abstract of the replies from 37 boards of conservators in England. Fifteen questions were put to each, which I will read if you will allow me. It will not take up much time, and it will show to the Committee how minutely we went into this. Of course the replies will speak for themselves. The questions are: "Have any gratings been ordered by your board to be erected, and, if so, at what places?" "What is the form of order made by the board?" "What has been the average cost of erecting the gratings?" The answer to that is, in four cases,

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the cost was 5*l.* 10*s.*, 10*l.* to 20*l.*, 30*l.*, and under 20*l.* Then, "Has it been found necessary to widen the mill-race in any case?" The answer in 34 cases is "No." Then, "If so, has the board been obliged to pay compensation to the owner of the land for any required to be taken for such purpose?" "Have owners or occupiers of mills opposed the erection of gratings, and, if so, how has the opposition been got over, or has it been necessary in such case to abandon the erection of the gratings?" "Are the mill wheels what are called bucket wheels or turbines, or of what description are they?" In four cases they are turbines. "The description of the gratings ordered to be erected, and in the case of turbines, have any close lattices, so as to prevent the fry of salmon entering the turbines, been ordered to be erected, and, if so, during what part of the year?" "Has the owner or occupier of the mill refused to erect close lattice-work on turbines, or complained of injury being done to their water-power by such?" "What authority decides whether gratings or lattice-works would interfere with the water-power?" "Is there any appeal against a decision in such a case, and how is such a question tried?" "On whom does onus of proof lie that the gratings or lattice would or would not be injurious?" "Has your board any funds to meet the expense of erecting gratings?" In 12 cases the replies were "No"; in three, "No, except from license duty"; the rest either "No information given," or "No mills," or "No salmon." "Are there funds sufficient to meet such expense, as well as that of protection, and enforcing the laws generally?" "Does your board consider the provisions of the law in respect of gratings sufficient or satisfactory, and, if not, what is the nature of their complaint against them, and, if possible, state their reasons generally?" Those are the 15 questions which were put to them.

7114. Would it take long for you to read the abstract of replies?—No; we sent these to 37 boards. In reply to the first question: "Have any gratings been ordered by your board to be erected, and, if so, at what places?" In 27 cases the replies were "No"; in six cases, the replies were "Yes"; in three cases no replies were received; and in one, "gratings put up by miller." "What is the form of order made by the Board?" In 33 cases the replies were "No"; in fact, the one follows the other. In one case the reply was "By bye-law of the Board of Trade." In England the conservators have the power to make, subject to the approval of the Board of Trade, bye-laws for the erection of gratings, and there was only one form issued for the whole of England. "What has been the average cost of erecting the gratings?" In 28 cases the replies were "None erected"; in four cases the replies were "5*l.* 10*s.*, &c." "Has it been found necessary to widen the mill-race in any case?" In 34 cases the replies were "No"; and in three cases there was no information. The one reply is consequent on the other, if you follow it: "If so, has the Board been obliged to pay compensation to the owner of the land for any required to be taken for such purpose?" In 32 cases the replies were "No land taken"; in two cases the replies were "No power to take land"; in three cases

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cases there was no information. "Have owners or occupiers of mills opposed the erection of gratings, and, if so, how has the opposition been got over, or has it been necessary in such case to abandon the erection of the gratings?" In two cases the replies were "Opposition and erection of gratings abandoned"; in two cases the replies were "Opposition, but got over; in one case by increasing width between bars; and in the other opposition not persevered in." None erected in other cases or no information given. "Are the mill wheels what are called bucket wheels or turbines or of what description are they?" In four cases only turbines, in the rest ordinary water wheels. "The description of the gratings ordered to be erected; and in the case of turbines have any close lattices, so as to prevent the fry of salmon entering the turbines, been ordered to be erected, and, if so, during what part of the year?" The reply is in one case "Gratings erected some distance above turbine"; in one case "Wire netting during the descent of fry"; in one case "Bars one inch apart"; in one case "No order necessary." At the wheels in three cases iron rods; in two cases rods three inches apart. "Has the owner or occupier of the mill refused to erect close lattice work on turbines or complained of injury being done to their water-power by such?" In three cases the replies were "No power to proceed against wishes of millowners"; in all the rest either "None ordered," or "No information given." "What authority decides whether gratings or lattice work would interfere with the water power?" In three cases the replies given were "Board of Trade"; in one case "Owner or occupier of mill." That is whether lattice work would interfere with the power of the mill. In one case the reply was "Conservators must take the risk of being sued for damages"; in the rest of the cases the replies were either "Information not given," or "No mills," or "No salmon in river." "Is there any appeal against a decision in such a case and how is such a question tried?" The replies generally were "To ordinary high court"; no direct information generally given. "On whom does the onus of proof lie that the gratings or lattices would or would not be injurious?" In five cases the replies were "Owners or occupiers of mills"; in 27 cases "No information given"; in three cases, "No mills"; and in two cases, "No salmon in rivers." "Has your board any funds to meet the expense of erecting gratings, &c., save those derived from licence duties?" In 12 cases the replies were "No"; and in three cases, "No, except from licence duty"; the rest "No information given," or "No mills," or "No salmon." "Are these funds sufficient to meet such expense, as well as that of protection and enforcing the laws generally?" In nine cases the replies were "Yes"; in six cases the replies were "No"; in 22 cases no information was given. "Does your board consider the provisions of the law, in respect of gratings, sufficient or satisfactory, and, if not, what is the nature of their complaint against them, and, if possible, state their reasons generally?" In six cases "No information given"; in one case the reply was, "Yes, only a few small flour mills"; in one case, "Yes, no complaints," in one case,

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"No difficulty at present"; in one case, "The Board will avail themselves of provisions of law if they have sufficient funds"; in one case the reply was "Consider it will be the greatest mistake to alter Irish law. If similar law could be applied in England, millions of salmon poul could be saved from destruction in mill leas, &c., but, as law now stands in England, the Board is almost helpless"; in one case the reply was, "No." In one, "No power is given to place gratings without owner's consent. No power is given to go on land to erect gratings, or to purchase land requisite for the purpose. Conditions attached to sections of Act are so stringent as to render that portion of the Act inoperative. The objection is that the Board is practically powerless in these matters. Neither sufficient or satisfactory. In the first place section 58 of 36 & 37 Vict. c. 71, merely authorises erection of grating, provided it does not interfere with the effective working of any mill. Act does not say who is to judge as to what is to be considered interference with the effective working, or by whom it is to be judged, or as to appeal from such judgment. Powers given are most unsatisfactory. (1) Although a board may fix grating, there does not appear to be any power for them to go on lands for that purpose. (2) No power to purchase lands for the purpose. (3) No power to place grating if owner of land or owner of mill objects. Experience of board does not justify them in expressing any opinion. Law altogether unsatisfactory being so belted round with provisions and restrictions as to be of little value. To quote from a high authority. 'It will be observed that the words here used "injuriously affect" are very wide, and the interpretation they have received by the courts under the 58th section of the Lands Clauses Consolidation Act is still wider, so much so that hardly any grating can be placed in a stream that does not in a greater or less degree injuriously affect the proprietor above or below it, as well as the miller. Power given to boards of conservators as to gratings, although it appears very large, is in reality so fenced round by provisions and restrictions as to be very small indeed, and although perhaps boards of conservators have no more useful power than that of saving the younger fry of salmon in their descent in the spring, and the spawning fish in their ascent in the autumn, from the destruction that awaits them at mills, yet, as given by the Fisheries Act of 1873, if boards of conservators wish to keep clear of litigation, there is no power that will require greater discretion in putting into force than that of placing gratings in watercourses.' Irish law is preferable to English in this respect. Furthermore, as Fishery Acts are passed for preserving a valuable food supply to the people of the United Kingdom generally, and it being a well-known principle of the common law of the realm that any private individual engaged in any business of profit or gain must succumb when it becomes a question of public benefit as against that of an individual, does not see that Irish law presses unduly on landowners and occupiers." The rest were either "No gratings," "No mills," or "No salmon in rivers."

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7115. Is that an abstract drawn up by yourselves?—By myself, so that I can vouch for the accuracy of it.

7116. Then the conclusion you draw is, is it not, that the law in England on this matter is practically unworkable and useless?—Practically it is a dead letter; and there is the proof of it in what I have read.

7117. And to assimilate the Irish law to it would be going backwards, would it not?—It would be a complete retrograde movement.

Chairman.

7118. Do you consider that the defect in the English law in any way accounts for the deficiency of salmon in English rivers?—I consider that the salmon producing rivers in England have been injured by the multiplicity of weirs that have been put up, and the great manufacturing industry of the country. I got that information from my own personal knowledge, as I was secretary for five or six years to the English Commissioners of Fisheries, holding at the same time my Irish office.

Mr. Tansinon.

7119. Have many weirs been put up in English rivers in recent times?—No, not in recent times. The salmon fisheries of England had been reduced to a very low ebb, indeed, by the erection of weirs in rivers for milling and manufacturing purposes.

7120. By that you are alluding to ancient weirs, are you?—Yes. Then up to 1881 you see the salmon fisheries were at a very low ebb, and since then you have improved the laws; you have had protection and other matters which you had not previously. I do not mean you to infer from that that was the sole cause of it, because you wanted protection and you had no means of protection in England.

Mr. Seton-Karr.

7121. We will go now to the question of turbines. Have you recently carried out some experiments?—I have by direction of this Committee.

Mr. Macarty.

7122. By direction of this Committee, do you say?—Not by the direction, but by the authority of the Committee.

Mr. Seton-Karr.

7123. Will you give us the particulars of those experiments?—Reading the evidence that was brought before the Committee it struck me that the statement made before the Committee as to the destruction of fish by turbines was very vague and indefinite. Even the miller himself could not say that the fish were not destroyed. The proprietors of fisheries and the owners could not say they were destroyed; and I took the liberty of writing to Mr. Cox, one of the honourable Members of this Committee, suggesting that this experiment should be tried as to whether the turbines, and what class of turbines, were really destructive and would kill the fry. I heard nothing more of it until the 4th of May, when I received a letter from Sir Everard Doyle stating that the Committee authorised me to do it; and

Mr. Seton-Karr—continued.

then I wrote to several millers stating that by the authority of the Committee I was going to carry out an experiment, and asking them to grant me permission to do so.

Mr. Macarty.

7124. It is very unfortunate, I think, that none of the millowners were made acquainted with this, because I did not know any experiment was being carried out?—That is a mistake. All the millowners were informed by me that I was acting by the authority of the Committee. I have the letters of Sir Everard Doyle here. I have this letter. On the 4th of May, "Dear Sir Thomas Brady. After considerable correspondence, I have received a letter stating 'That the Lords Commissioners of Her Majesty's Treasury will sanction an expenditure not exceeding 50 £ for the experiments in question, including the travelling and personal expenses of Sir Thomas Brady; and that this is in lieu of, not in addition to, the authority sanctioning the expenditure of 5 £.' Sir John Whitaker Ellis wished me to add that he had no doubt you would keep as much within the limit as you could. Perhaps you would be good enough to let me know about where you think the experiment will be concluded. Yours faithfully, Everard Hastings Doyle." Perhaps it will be as well for me to read my letter which caused the letter from Sir Everard, because the Treasury sanction which came to me originally was to expend 5 £. I think it will inform the Committee of the whole facts. Sir Everard Doyle informs me on the 20th April that the Treasury have acceded to my views, and will grant me 5 £ for expenses. Time went on, and I wrote this to Sir Everard. "Dear Sir Everard Doyle. I am in receipt of your letter of 20th inst., enclosing Mr. Puller's letter sanctioning the expenditure of 5 £ for experiments to be made in reference to salmon fry passing through turbines, so as to have practical and authentic information for the Select Committee, instead of the vague statements made by witnesses on both sides. Mr. Puller adds in his letter that if the amount is found to be insufficient he thinks it probable that a further sum would be sanctioned if asked for within reasonable limits. When I suggested these experiments, my estimate, as may be seen from my letter, was framed on the assumption that they would only be at Lucan, which is only a few miles from Dublin, and that was in consequence of the evidence given by one of the witnesses who had a turbine at Lucan. I have since found out that there are a great many descriptions of turbines, and that while experiments with those at Lucan would prove certain things, yet, where others of a different kind, with much larger openings and greater fall are used, as in the north of Ireland, it would not settle the dispute with regard to these latter, as the owners would naturally say that the experiments with the Lucan turbines did not meet the case of theirs of a newer and different description. The Loeffel turbine is the one used in the great mills in the north. It has larger openings than others, and the water escapes differently. I have had, since the evidence was brought before the Committee, a conversation with one of the engineers

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Mr. Macartney—continued.

who gave evidence; and to my observation, that it was strange that neither the manufacturer of these turbines, nor the millers who use them, could state positively whether fish would be killed in passing through, he said that was true; and he considered that the practical way of dealing with the question which I proposed would be the proper solution. He offered to assist me in every way in his power." (That was Mr. Cadle, the engineer, who was examined before the Committee.) "Now I can carry out the experiments at Lucan within my estimate, but from what I now say I am sure they will not be deemed to be complete, and therefore I think they ought also be carried out at, at least, two places in the North, Dinsmore's and Webb's. I would not, however, attempt to undertake the expense without more certain assurance of being recompensed than that conveyed in Mr. Fuller's letter; as it would not be within reasonable limits. The expense of visiting the northern mills and making the experiments, at which I must employ men, provide nets, &c., would be at least three times that of my estimate for Lucan. If the Treasury gave me the necessary authority to secure my being recompensed, I will willingly undertake the work, and carry it out, I hope, satisfactorily, and I don't think they need fear me running up a big bill. I would be as economical as I could, and when I require nothing for my own services, save my usual nightly allowance when absent, and actual travelling expenses, I think I might be trusted to get the work done economically. In a rough estimate, I do not think the expenses would come to more than 20*l.* for all the cases I contemplate, and if I get the fish at once, and handily, they would be less. I will be glad to hear from you, without delay, on this matter, as not a moment is to be lost, and indeed there is very scanty time now to get everything ready for the experiments, as of course I would not, take any steps, even in the matter of Lucan, till I had heard from you."

Mr. Seton-Karr.

7125. Then upon that you received the letter of the 4th May?—Yes.

7126. Will you read that letter again?—"After considerable correspondence I have received a letter stating: 'That the Lords Commissioners of the Treasury will sanction an expenditure not exceeding 50*l.* for the experiments in question, including the travelling and personal expenses of Sir Thomas Brady, and that this is in lieu of, not in addition to the authority sanctioning the expenditure of 5*l.* Sir John Whittaker Ellis wished me to add that he had no doubt you would keep as much within the limit as you could. Perhaps you would be good enough to let me know about when you think the experiments will be concluded.' In any experiments that I carried out I wrote to the millers from my own house to say that I had the authority of the Committee for doing it, and asked their permission to do it; and in the case of the River Liffey, where I first commenced experiments, I brought our own engineer, Mr. Gray, a very eminent man, and I brought also the mechanical engineer who was examined before the Committee, Mr. Cadle, and he went into the

Mr. Seton-Karr—continued.

matter carefully, and gave me a deal of attention, and behaved exceedingly kind in doing everything he could, for he wished to see the experiments himself.

7127. What notice did you give the mill-owners?—I wrote to each of them asking permission.

Mr. Macartney.

7128. To the millowners in the north?—Yes, I wrote to Mr. Webb asking permission to try the experiment.

7129. What notice had they of the experiments that you did actually try?—Do you mean when I was at Lucan?

7130. Yes.—I did not give them any notice as to that; I did not give any notice to the owners in the north that I was going to try the mills at Lucan; and I did not give the owners of mills at Lucan notice that I was going to mills in the north. I could not carry out the experiments without their permission.

Mr. Seton-Karr.

7131. Now will you give us the details?—I had a small mesh-net prepared, in the shape of what is known as an eel-net or coghill, which is a net very wide at the mouth, twelve feet across, and tapering down like that (*describing*). I had hoops in the net, and then I had a box into which the net fished like that, and that was covered with perforated zinc. That was floating.

Chairman.

7132. Is this all explained in your report?—Yes.

Mr. Seton-Karr.

7133. Does your report explain *this diagram*?—I think it does: "Wide at mouth and tapering down, with a long tail kept open by rings, which were inserted in a floating box covered with wire. The mouth of the net was twelve feet wide on the sale or fast rope, which was heavily weighted with lead. At each end of the mouth of the net were poles to keep the net in position in the water. These were fixed or held in the tail-race as near up to the discharge from the turbine as could be obtained, in order that nothing coming out of the turbine when in motion, save the water, could escape the net. In some places it was very difficult to get the net fixed firmly, and near the turbine." We could not get up near the turbine in many places.

Mr. Tomlinson.

7134. What do you mean by "in many places"?—I tried in four places altogether, and I could not get up near the turbine, except in one place.

7135. I thought you were referring to the one experiment at Lucan?—No, this contains the three experiments, and in the north of Ireland one, that is four.

Mr. Macartney.

7136. Three different mills on the Liffey and one in the north?—Yes. "The first mill tried was that at Lucan on the River Liffey called the Devil's Mills, belonging to Messrs Shackleton" (Mr.

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Mr. Macartney—continued.

(Mr. Shackleton was examined before the Committee). "The mill has an Alect turbine and a water-wheel in the same race; the turbine is 86 inches; revolution stated to be 70; and the fall seven feet."

Mr. Seton-Karr.

7137. You do not know how close that turbine was set, do you, or what the interval was between the revolving wheel and the frame outside?—No.

7138. You cannot tell me what the clearance was?—No; you could not get at the turbine to see that.

7139. You were not informed what it was, were you?—No. "When the net was fixed below I put 10 salmon fry" (when I say "fry" I mean "smolts").

Mr. Tomlinson.

7140. You mean salmon in a condition to go down the river?—They were going down the river. "I put 10 salmon fry into the water just at the upright shaft of the turbine." As the turbine was revolving like that I put them in here (describing). "After keeping the turbine working for 10 minutes it was stopped; the net and the box into which the net would fish, and the fry, if any, should go, were taken in and examined; there was no sign of anything in either" (either dead or alive). "If fry had got into the net they could not have gone through, and should either have gone into the box or remained in the net, and would have been found. I then killed four fry and put them into the turbine when at work, and saw them floating down the stream in about 10 minutes. I got them with a long landing net; two were uninjured in appearance; one was broken across the back."

Mr. Seton-Karr.

7141. Did you fish them out yourself?—No, my men did.

7142. You did not take them out yourself?—No, I did not sensibly take the net in my own hand; I had the men employed there; Mr. Shackleton and some members of his family were there besides. "As I could not recognise that they were the fry I had put in, not having marked them," I felt that a question might arise that these fish are not the fish I put in at all; it might be said perhaps by some unbeliever that they were not the fry, and then I thought I would mark them, so I killed two more. "I put in two other dead ones marked, and soon afterwards got both in the stream below the turbine apparently uninjured."

7143. Did you examine them yourself?—Yes, personally, in my own hands.

7144. Then what do you mean by "apparently uninjured"?—I could not find any bones broken. "Apparently uninjured" means if the water struck them and they were drowned or killed by some other means without having their heads knocked off or bones broken. Of course they must have been injured in some way or other; but they were dead when I put them in, and they came out apparently uninjured. "The net although 12 feet at the mouth was too small for this tail race." (This is the reason, I think, did not get 0.80,

Mr. Seton-Karr—continued.

say of the fry.) "And the bottom being rocky and very rough and uneven it was impossible to keep the net so close as to prevent fry passing." If fry came down alive through the turbine I freely admit they might have passed under the net, because it was like this at the bottom, and I should have had a long chain weight to keep the net level with the ground. "It was my intention to try this place again with double the size of net and chain instead of foot rope." Mine was a rope heavily loaded, but that would not take the rocks. "The next mill was on the River Liffey, Lucan Mills, belonging to Messrs. Hills." This is a very extensive mill with over four hundred hands employed. "We were enabled to fix the net very close up to the outfall of the turbine, owing to the facilities obligingly afforded by the proprietors, who took up several planks covering the outlet, and enabled men to go down on ladders at each side and fix the net in proper position." It is right that I should give a little more explanation than I can possibly do in writing to the Committee. Where the turbine is discharging here there is an immense covering, and the proprietor of the mills ripped up the boards all along here for me, took them up, and took a great deal of trouble in order that we could get down by ladders into the water; he stopped his works and everything of that kind. By that means I could get the net fixed right up close to the turbine when it was set in motion. "The turbine at which the experiments were tried was a Lefel 56 inches, with the same fall as Devil's Mill. I put 23 fry into the turbine pool, and after 10 minutes took up the net and the box. I found in it six fry alive and six dead, and two dying, four mashed up, one trout alive $1\frac{1}{2}$ lbs. weight, and one eel about half a pound weight."

Mr. Tomlinson.

7145. Alive?—Yes.

Mr. Seton-Karr.

7146. How had the trout and the eel got there; have you any idea?—My impression is (of course I could not say what happened in the dark) that when we put down the net in that way a trout must have been below, and we caught him. He could not escape me; he could come up the tail-race and go right up to the turbine; that would do fish no harm, and he might have been there when I put down my net, and ran it up close to the turbine. "There were no marks of injury in the living, dead, or dying fry." That is a very extraordinary thing.

7147. How was the one mashed up?—He was broken into bits, regularly mashed up; I could not find any other word in the English language to describe it. He must have got into the turbine, and probably got the benefit of two or three revolutions. "At this mill there is another turbine which is protected by an iron grating permanently put down to protect the turbine. The space between the bars was $\frac{3}{4}$ to $\frac{1}{2}$ inch. The miller makes no complaint of obstruction, and put them up himself without reference to fish." They certainly are a perfect protection to fry, in my opinion, and I would never ask a miller to do more than that.

7148. Do you happen to know what kind of turbine

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turbine he has got?—I think they are both Alcot's.

7149. Are they modern turbines?—They are on that principle.

7150. And he has this 3-inch grating there, has he?—Yes.

Mr. Moystary.

7161. Are you sure they are Lefel turbines? I am almost sure they are Alcot's.

7152. Did he tell you so?—I am nearly certain of it.

Chairman.

7153. Whose mill was it?—Messrs. Hill's, you have not had him here. All the turbines on the Lucan are modern turbines.

Mr. Seton-Karr.

7154. Do you happen to know how long this particular turbine has been erected?—I cannot tell you; I think you will find it in Mr. Cadle's evidence; I am almost sure Mr. Cadle says he either put it up himself or that he helped to do so, or something of the kind. "The next mill examined was at the Salmon Leap, River Liffey." This is owned by Mr. Frederick Wooley, and it was a Hercules turbine. The diameter is only 21 inches, the revolutions are stated to be 325, and it has a fall of 28 feet. You see the great fall makes the revolution, and there is no necessity for a large turbine. "The net was fixed in the tail-race, but a good distance below the out-fall from the turbine, between which and the net a water-wheel intervened." He has got both a water-wheel and a turbine, and you have no means of getting between the water-wheel and the turbine to fix any nets.

7155. Is it an undershot water-wheel?—No, it is an overshot wheel. The water comes in at the top. It is just immediately below the Salmon Leap. If you have ever been on the Liffey it is a sight for visitors to see the salmon jumping up the falls at Leixlip. The name is taken from the Danish word. The water supplies this large mill from a great height above; the fall is 28 feet; and then the water is led on to the top of this wheel; but that wheel is very seldom now used since the proprietor put up this small turbine which does nearly all the work of the mill. I merely say this to explain why I did not get any nearer to the turbine. It would be impossible to go there without danger to life, without the proper appliances, and it would take a very long time. The bottom of the fall is 28 feet below, and you could not get the net in very close. But all the water from the turbine must come down this tail-lead under the wheel. The water from the turbine runs under the wheel. You see the water tumbles over the Salmon Leap; then they have taken the water in a lead, and have put down a turbine which is working with that 28 feet fall. Then they have beyond that a water-wheel, if it was necessary to work it, and they conduct the water by a shoot here which supplies the turbine at the side.

7156. Fish coming through the turbine alive or dead would not be affected in any way by going under this water-wheel, would they?—

Mr. Seton-Karr—continued.

They might be stopped between the distence, because it is very deep under the turbine.

7157. But they would not be injured by the water-wheel, would they?—No, they could not be injured. I will sketch the place. The river is here and there is a great fall here, and this mill-lead comes here and takes the water in here (describing). "There was no possibility of getting nearer the turbine. I put 31 fry into the turbine pool. After 20 minutes the net and box were taken up and we got 10 fry in the box. One was alive, one was dead with its head off, one dead with its neck injured, and seven were dead with no marks; another was taken out afterwards in the tail-race" (which came down after I had removed the net) "with its head crushed and partially decapitated. At this turbine there are three-eighth inch iron round bars, seven eighth inch apart, put up to protect the turbine."

7158. Is that fully protected?—No; it is wide enough for any fry to go through; but I may say this, that there is not much likelihood, in consequence of what I have stated before, of fry taking that course; but if they do take that course they must go into that turbine. "The next experiment was on the Ballinderry River, County Tyrone, at Cough; proprietors, Messrs. Duff. There are three turbines here, two Schelley's and one McAdam's; the fall is about nine feet. The larger Schelley and the McAdam were at work. The larger Schelley is 72 inches in diameter. Revolution stated to be only about 38. For the protection of this turbine" (not for the fish) "there is an iron grating permanently fixed in the box or pool which contains the water that feeds all the turbines. Though this grating only protects the Schelleys (the McAdam turbine having before it a wire network, being an irregular mesh, permanently fixed for the protection of the turbine), the bars of the grating protecting the Schelleys are 1½ to 1½ inches apart. Into this larger turbine six fry were put when the turbine was working." (Instead of trying my net I tried a new thing.) "A wire net on poles leading into the box in the centre having been first fixed in the tail-race and held, leading from each bank of the tail-race to the centre as close to the turbine as it was practicable to place it. The wire netting was down a little over ten minutes, and then taken up; but no fry were captured." The water, instead of going through the net, broke over the wire netting, and so any fry might have been carried away; whether dead or alive, of course, I am not offering an opinion. But this was to try, as I thought, a better experiment. "Three fry were shortly afterwards seen swimming over the case of the turbine and about it when the turbine stopped and the water was quiet." I saw the three little smolts swimming right over the top when the turbine was stopped.

7159. What conclusion do you gather from that; that they were part of the fry you put down?—Certainly.

7160. And they were uninjured?—Yes, I certainly say so; I have no doubt in my own mind. It is hard to state that so-and-so were the fry that were put into the river; but I had no doubt whatever they were. "The second experiment

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ment was at the McAdam turbine, which is 85 inches in diameter, and stated to have 85 revolutions. The net and box were used here* (That is, the old net, as I found the wire did not answer) "and placed at a convenient distance from the turbine. Eight fry were put into the turbine box or pool. The net was kept down 15 minutes, and then lifted. Two fry were got in the box alive, and one small trout dead; it was injured in the head, but it was quite evident it had not been recently killed, though it was quite fresh."

7161. There were no dead fry on that last experiment?—No; I got two living fry out of the eight I put in.

Chairman.

7162. What is the result of your experiments; do you think that the passing of the smolts through the turbine is likely to destroy them in large quantities?—I got so very few fry alive that I cannot help thinking that they must have been killed at once as they went through, and dropped into the deep water below as they were struck. I used such precautions that I do not see how the fry could have escaped my net otherwise. In two places, I admit they could.

7163. You only put in, except in the one case when you put in 30, a small quantity of fry?—That is so.

7164. Supposing fry were swimming down in the natural course, would they come down in a very large body?—Yes, a very large quantity.

7165. They would go in hundreds, I suppose?—You might say thousands.

7166. They would go down the pipe and then be whirled round and shot out again in thousands, would they?—Certainly.

7167. Would that increase, or would it not increase the liability of them being killed?—Of course it would increase it. I had the greatest difficulty in carrying my fry alive. Some of them were brought from as far as Zion Mills, and we lost a great number of them. Smolts in that state are very hard to keep alive. We need water constantly on the road; but, while in the train, it was almost impossible to keep them alive.

Mr. Seton-Karr.

7168. Do you think that this experiment was a satisfactory test of whether turbines kill smolts or not?—They were not so satisfactory a test as I could have wished, but the time would not allow any greater test.

7169. Is it very hard to make a satisfactory test?—Most difficult, and I brought with me from the North of Ireland one of the most practical men I could find.

Mr. Macartney.

7170. Who was it?—Mr. McDermot. I may tell you that I took the greatest pains to bring the best talent that I possibly could. I had a mechanical engineer, and the best man accustomed to nets I could possibly find.

6.80.

Mr. Seton-Karr.

7171. You did not make any experiment at Mr. Webb's mill, did you?—No; I am sorry to say Mr. Webb would not suit my time, and he would not allow me eventually to do it. I regret to say to the Committee that I received a very discourteous telegram from Mr. Webb on the subject, so much so that, with any other person, I would have point blank refused to have gone near him or his mill afterwards; but I did not. I have the whole correspondence.

Mr. Macartney.

7172. I think you had better put it in, because I shall ask you some questions about it?—Certainly, I will do so.

Mr. Seton-Karr.

7173. Have you the correspondence there?—I have everything.

7174. Perhaps you will kindly read it to us?—I made a *précis* of the matter, and I have the letters here. On the 23rd April I wrote to Mr. Webb asking him would he have any objection to me trying the experiment of passing fry down through his turbine should I be able to go and do so, that such an experiment might tend to the solution of the dispute now pending. I had no authority to do so then; and I think that is about the time I wrote to Mr. Cox. Mr. Webb did not reply till 30th April. He asked pardon for inability to reply till then, and said that if experiments suggested could be carried out in a manner that would make it a reliable and complete test as to whether salmon fry were killed by the turbine he should give me full opportunity of trying it on behalf of H.M. Inspectors at as early a date as could be arranged, and with an understanding which he should explain in a further communication from London, for which he was just starting, and that his London address during next week would be Hotel Métropole. I replied that it was my intention to make the experiments a reliable and complete test, but could not do it without the special authority of the Select Committee. I had no reply. On the 5th May I wrote to Mr. Webb as follows: "Having this morning received authority to try the experiments contemplated in my letter at your mills I wired to you to-day as follows: 'Have now received authority to carry out reliable and complete test at your mills; presume I have your authority. Your further promised communication not yet received. Please reply this post and oblige,' which I now confirm. In yours of the 30th ult. you state that you will give me full opportunity of testing the experiments with an understanding which you would explain in a further communication from London. I will now feel obliged for it, and also if you will kindly give your manager instructions to afford me every facility for making my experiment a reliable and complete test." Having waited for five days and no reply having been received I wired: "Kindly say if I have your permission to try my experiments at your turbine. Reply prepaid." On the same day I wrote to Mr. Webb as follows: "I wired to Hotel Métropole to you this morning to let me know if I had your permission

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permission to try the experiment of passing fry through your turbines. Reply prepaid. I would be prepared to do so on Friday next if you have no objection, and would be glad to have your reply by return, which would oblige." On the 11th of May I received a telegram from Mr. Webb as follows: "Forced to leave London day after arrival, and matters of pressing importance occupied me ever since returning; glad to meet you or Hornsby at Committee meeting on Friday and make arrangements for test if desired and practicable. Cannot be conducted in my absence." No reply to this telegram was asked, nor did it appear to me to require any reply, and therefore I did not send any. On Saturday the 14th May I called at Mr. Webb's mill at Randalstown, as I had been in the neighbourhood, and saw him, when he informed me that he had heard I was at Ballymena and wired to me there, and he read part of a copy of his telegram, which afterwards reached me on 16th instant, having been returned by one of the millowners to whose care it had been addressed. The following is a copy of the telegram: "14th May. Returned from London this morning, receiving no communication there in response to telegram of Wednesday, have arranged for experiments Tuesday, 17th, which you can superintend. On arrival of 10.15 train from Belfast will have a supply of fry ready for you to be let loose first in current of grating, testing theory of bar vibration, afterwards you can pass them direct." On the 14th I informed Mr. Webb that I understood I was to be in London on Friday the 20th, and having other matters to attend to, it would not be possible for me to attend on Tuesday, the 17th, at Randalstown. He stated it was the only day he could give up to it, and he should be present; and explained that I could be in London on Friday morning easily. I informed him that experiments were out of the question for that day, that I had just sent the nets I had been using at Cough back to Dublin by train, and that they would require overhauling and shoring to suit his tail-race; and that they could not now be received by me and be ready in time for Tuesday. I found that Mr. Webb's tail-race was 18 feet. I asked him to get it measured for me, and he did so. Mr. Webb made no offer then of providing nets, as, if he had, I would have explained to him the nature of the net I would alone depend on, and which he could not provide in the time. I explained also that as his telegram of 11th did not refer to any reply being required, and that it stated he was to see me or Mr. Hornsby in London, I did not imagine that he expected any reply from me, and I considered none was necessary. Immediately on receiving his telegram of 14th (on the 16th) I wired early that morning, 16th May, "Could not be prepared for experiments at your place to-morrow, nets not yet received back from Cookstown." On the same day I received a telegram from Mr. Webb, "Please wire reply at once if you will be present on Tuesday morning on arrival of 10.15 train from Belfast to conduct test of passing fish through turbine. There is no difficulty whatever in your getting to London by

Mr. SETH-KURT—continued.

Friday. I shall provide you with netting to catch dead fish." Then I wired immediately on the 16th May, "For reasons given you and in my telegram of this morning cannot be in Randalstown to-morrow. Experiments could not be carried on without a particular kind of net which you could not provide." Then on the next day, the 17th, I received a telegram at nearly seven o'clock p.m. as follows: "In reply to last telegram backing down on apparently frivolous grounds, bear in mind I have offered you a net that will span race and catch all fish dead or alive passing from turbine. Owing to your failing us to-day have arranged for experiment to-morrow, Wednesday, same hour, and would ask your attendance, when if not present test will proceed without you." The hour at which I received this telegram precluded the possibility of me catching a train from Dublin to Belfast that night, even if I would have acceded to a request couched in such discourteous terms, and had the nets ready. I, therefore, early next morning (18th, at 10.30 o'clock), wired as follows: "Your telegram received last night too late. Authority received from Committee this morning extending time for completion of experiments, and I will not be required in London till Tuesday next. Will be ready for experiments at your place on Saturday morning. Please wire at once if I have your permission to carry them out that day. Reply prepaid." Then on the same day I wrote to Mr. Webb, as follows: "I sent the following telegram this morning: 'Your telegram received last night too late. Authority received from Committee this morning extending time for completion of experiments, and I will not be required in London till Tuesday next. Will be ready for experiments at your place on Saturday morning. Please wire at once if I have your permission to carry them out that day. Reply prepaid.' I am now waiting your reply." On the same evening, after 6 o'clock, I received a telegram as follows: "Will send you reply to telegram of to-day by post." No letter as promised in the above telegram having been received, I wired to Mr. Webb the next morning as follows: "Your letter referred to in yesterday's telegram not received to-day, as promised; I will be at your mill on Saturday morning with net, &c., and hope you will afford me facility for experiments, and that millowners will attend to see them." On that same day, between 4 and 5 o'clock, I received the following telegram from Mr. Webb: "Letter replying to your telegram of yesterday by first post this morning." On the night of the 19th May, I received from Mr. Webb a most discourteous letter declining to have anything to do with me. This is the letter: "I wired you as follows yesterday." (I have read that telegram.) "That telegram was addressed to you under feelings of very considerable annoyance, I might say indignation at the course pursued, and what appeared to me to be the untenable excuses raised, avoiding to conduct the test, at first pressed for, and in regard to which I had stipulated it should be a complete test. I had travelled from London, and had gone to considerable trouble and expense to

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[Continued.]

Mr. Seton-Karr—continued.

to have everything ready for you on Tuesday, including nets (failing your own), and a tank of salmon fry, which we had a difficulty in keeping alive. At some inconvenience I postponed the experiment till Wednesday, and sent the above telegram." I wish the Committee to observe that I got these telegrams so late that it would be impossible for me to catch a train that night, and the next train would be 6.45 the next morning. I would not mind having started at that time if I had been treated with common courtesy, but certainly I was not going to be Mr. Webb's servant. Then Mr. Webb goes on: "I postponed the experiment till Wednesday, and sent the above telegram on Tuesday afternoon, fixing the experiment at an hour that would enable you to reach Randalstown by first train from Dublin same morning (Wednesday), at same time, failing your presence, I had made arrangements with a gentleman acquainted with the habits of fish and well-known for his efforts to protect them, to carry out the experiment, while stipulating that he was to hand over the conducting of the test to you if you arrived. I have now to say in response to your telegram of to-day offering to carry out the experiment on Saturday next, that the experiment was carried out to-day under the direction of the gentleman alluded to in a most complete and exhaustive manner calculated to afford to the Select Committee, if they desire to avail themselves of it, much wider, I believe more complete information on all points than the experiments conducted by yourself. Under the circumstances I would say that, even if I were able to be at Randalstown on Saturday, which I do not expect to be, I can have nothing further to do with you in the matter. And you will excuse me for saying, while recognising your earnestness and sincerity, that I think you have placed yourself in a false or anomalous position by applying to the Select Committee for authority to conduct experiments as an impartial expert, while at the same time you address communications to the public Press discussing the matters under the consideration of the Committee in the spirit of 'before mills were, fish was,' to quote your own words. Yours truly, C. J. Webb, Hon. Sec." With regard to what Mr. Webb is alluding to in that letter as to discussing matters in the Press, I wrote to the "Freeman's Journal" in Dublin a letter which I have here, and the Committee, if they wish, will see whether my letter discussed the question at all. I merely referred to the fact and the great importance of ascertaining the fact whether fry were killed by turbines or not. I never discussed the question, but I discussed the great importance of the question.

7175. Have you a copy of the letter to the "Freeman's Journal" here?—Yes.

7176. The net result is that you were willing to carry out this experiment at Mr. Webb's mill, but your statement is that he did not give you facilities for doing it?—Certainly, nor from the commencement. I never heard anything from Mr. Webb from the 30th April till the 11th May, and all that time was going, and the matter had to be done in a great hurry after all.

O.B.

Mr. Seton-Karr—continued.

7177. Will you put that letter in?—Yes. (The letter was handed in.)

Chairman.

7178. It is simply to record what you wrote in order to show that your mind was open!—Certainly; I was dealing with the point that the Committee had not positive evidence before them, and I was most anxious that they should have that evidence of the great loss it would be to the salmon fisheries if this injury was a fact. There is a letter from Mr. Dinmore replying in that paper. Then Saturday's proposed experiments were consequently abandoned. Having made so many applications to Mr. Webb to be allowed to carry out these experiments and not having received any reply between the 30th April and 11th May to either letters or telegrams, although replies for the latter were prepaid, I came to the conclusion that he was unwilling to allow any experiments to be made until I met him on Saturday the 14th. I was confirmed in this opinion by receiving from Mr. Dinmore on Friday the 13th a telegram at Cough, when I was actually making experiments at a turbine there at the suggestion of Mr. Dinmore himself, who I was aware was a member of the New Millers' Association, and acting in concert with Mr. Webb, as follows: "Millowners' Association forbid individual action without previous arrangement between interests involved. I therefore regret my wheels not at disposal. Communicate with Webb in London, the secretary." On completing my experiments at Cough, after receiving this telegram, I saw there was no use bringing on nets, &c., through the country, and I dispatched them by train to Dublin on the 13th, and went to Ballymena the same evening. I called at Mr. Dinmore's mill on the morning of the 14th, before eight o'clock A.M., to refresh my memory as to some of his premises, and then drove to Randalstown to visit Mr. Webb's mill. The result I have already explained. On visiting Mr. Dinmore's mill just as the workers commenced (which is not until eight o'clock in the morning), I found he had not worked his turbine for a fortnight, except the day before, in consequence of want of water. He commenced the day before, and had worked it the day before, he told me, and the lattice work of that kind in the room, which he informed the Committee, as I see by his evidence, was lying on the bank, was in the sluice railed down in three places, so that it could not be removed. There was a good deal of trouble with a hammer in getting it removed.

Mr. Seton-Karr.

7179. When was this?—On Saturday, the 14th May.

7180. How do you reconcile that with his statement that it was lying on the bank?—I cannot reconcile it at all.

Mr. Tomlinson.

7181. Why did you want to remove it?—I wanted to see what dirt there was on it. It was a very friendly thing of Mr. Dinmore; he was affording me facilities for doing everything, and he would have given me permission to try his tail-race.

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7182. What

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Chairman.

7182. What was the condition of it when you removed it?—It was partly dirty, but it was very hard to get it up; in fact, Mr. Dinsmore had to call two of his mechanics about the place to fetch a hammer. But what struck me as being extraordinary was that in the evidence which came before the Committee it was said that this was only put down when they saw the bailiff coming; but here I visited the place at eight o'clock in the morning, and it was nailed down at three places. Now this was a friendly visit of mine, and Mr. Dinsmore was very friendly with me, and offered to carry out the experiments; but he said he would do nothing without Mr. Webb's permission, as he was a member of the Millowners' Association.

Mr. Seton-Karr.

7183. How long had this mill been dry?—He told me he had not worked the turbine for a fortnight.

7184. You do not know whether this grating had been down longer than a fortnight, I suppose?—No, I cannot say.

7185. Do you know whether he had worked his mill, or was working his mill, with the grating in its place?—He had steam power; the grating might have been down for all I know.

7186. Is he working it now with water?—On the 14th May, when I visited it, the turbine was going to be at work. It was working the day before.

7187. Was he going to take the gratings up?—No, they were permanently down the day before when he was working it.

7188. Then they were not interfering in any way with the working of his turbine, were they?—I cannot say.

7189. His turbine was working, was it not, with the grating in place?—Certainly.

Mr. Macartney.

7190. On the day you were there?—On the morning of the 14th they commenced to work.

7191. With the fry-guard up?—With the lattice up. On that very same day I visited Mr. Young's mill at Fenaghy, and I found there, perhaps, as good a managed mill as ever I was at, and everything in splendid order. He had a grating at the head-race; he had a permanent grating over his turbine, with $\frac{1}{2}$ to $\frac{3}{4}$ th bars apart. The local inspector of bailiffs was with me, and he had the screen, or that kind of fry-guard which we have here, on the bank. I immediately asked the inspector, "What is the use of putting down a fry-guard like that; are not these bars sufficient to keep fry out?" and the water bailiff said, "Certainly," and I said to the occupier of the mill, "Have you any objection to those bars you have down now; do they throw any backwater on you, or interfere with the effective power of your turbine, or have you put them down permanently?" He said, "They do not interfere with me; they were put down for our own protection; they were never put down for fish; but we complain when we put down such gratings as that, that we should have to put a fry-guard over them." I said, "The fry-guard is unnecessary." Some of the bars were only half an inch, and some only five-eighths of an inch apart.

Mr. Seton-Karr.

7192. In your opinion, is $\frac{1}{2}$ th sufficiently small to keep out fry?—I think it is; but a small fry might go through.

7193. But you think, do you not, it would keep out the majority of them?—Yes, I certainly think a $\frac{1}{2}$ th-inch grating like that Cork one would be sufficient.

7194. How long has Mr. Young had this down?—Constantly since he put up the turbine.

7195. What kind of turbine has he got?—I do not know what kind of turbine it is. It is on the Malmo river.

7196. How long has it been up?—It has been up some years; it was put up when the mill was started, I suppose.

7197. Is it a modern turbine?—Yes. The Hercules turbine has been put up within a few years; but that is an old turbine.

7198. On the 22nd March Mr. Dinsmore told the Committee, in answer to Question 440, that his lattice was lying on the bank?—Yes, that is the reason I mentioned it, as it appeared so extraordinary.

7199. Is he referring to the same lattice which you say you saw on the 14th May nailed down in its place?—Certainly; there is only the one.

7200. He had not another lattice or grating which he was talking of, had he?—No, he has only the one.

7201. He must have nailed it down since he told the Committee, I suppose. The result of your experiments shows conclusively that the turbine does come injury to the smelts, does it not?—I think so; there is no doubt about that.

7202. The only question remains, how great that injury is?—Yes, and there is no question also that some turbines, I do think, might not do the great amount of mischief that other turbines will do. The number of revolutions I think must have a great effect, and the smallness of diameter and the amount of fall must have a great effect; and I think it is rather hard that a man who uses a turbine, and is able to prove that turbine is not injurious should be compelled to do the very same thing as a man who is using a turbine which is notoriously doing injury.

7203. And that is a question, is it not, on which the fishery inspectors are well qualified to judge?—I think they ought to be.

7204. Do you think they can ascertain in what circumstances and in what places turbines are doing great injury?—They might, I think. The miller or the man who uses the turbine ought to be able to show that his turbine is not injurious. He puts up a better motive power than he was originally entitled to, he has no property in the water, and when he puts up an improvement to his motive power I think he has a right to show that he is not doing an injury to the public interests. If he injures private men he is liable to an action.

7205. Is not the onus of proving injury under the existing law on the shoulders of the Board of Conservators?—Yes, or those who prosecute, in consequence of the decision of the Recorder of Belfast on the interpretation of the words, "Which may be injurious to the passage of salmon."

7206. What is your opinion shortly of the injury

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injury turbines inflict on smolts going down to the sea?—We have proved in my experiments that they kill some of them. It is six alive and six dead out of 12. When they go down in large quantities, if that be the proportion, they must be killed in much greater proportion.

7207. I think you have said already that the fact that large numbers go into the turbine at the same time would increase the danger?—No doubt it must do so. Anyone who knows anything about the habits of salmon or salmon fry, must know that they all go in schools or shoals down the river. I have seen a shoal extending in the River Slaney, while standing at Ennis-corthy Bridge, making the water literally boil. They were playing about until the instinct came upon them, and when they obeyed the instinct it was like a cloud, just as if one of them tried to get from the shadow of the bridge, and then away they went in myriads.

7208. They follow one another, I think it has been said, like a flock of sheep?—It is not following one another; they go all together in one mass. I have seen that myself.

7209. When did you issue this turbine notice to mill owners?—That turbine notice was issued in 1890.

7210. Not before?—No, I cannot find any record of any other notice.

7211. In your opinion ought turbines to be protected by law?—Most undoubtedly, but I should say there ought to be this distinction drawn between turbines. That a turbine such as will not do mischief should not have more than the ordinary guards that a miller puts up for his own protection. That is the law at the present moment, as declared by the Recorder of Belfast. But it would inflict very great injury or might do so in many places if turbines indiscriminately were allowed to be put up and not be guarded against the passage of fry.

7212. What, in your opinion, is the effect of Mr. Macartney's Bill if passed?—Mr. Macartney's Bill of course repeals fry guards and everything, and leaves it to the millers or any one to put up turbines wherever they like and when they like.

7213. In your opinion what would be the practical effect or working of that Bill?—The practical effect of that would be to inflict a grave injury to many cases on the salmon fisheries of the country.

7214. By leaving dangerous turbines unprotected, you mean?—Certainly; and we know perfectly well, or I believe myself, that the turbine is the coming motive power; and we hope (I may not live to see it) industries will be developed in Ireland; and, as a matter of course, if mills spring up, turbines will be the motive power. Then if you are to have no protection and a man runs an injurious machine affecting the public food of the country as well as the employment of the country people, it must be a source of very serious damage.

7215. To go back to your experiments, do you think there were many or any smolts that were injured by the turbine which you did not see and which you did not catch?—That I could not say.

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Mr. Seton-Karr—continued.

7216. Then as interested in the industries of Ireland, are you strongly opposed to the passing of this Bill?—Certainly.

7217. Do you believe the millers can be protected without interfering with the effective working of the mills?—I do believe so; I not only believe so, but I am perfectly convinced of it; and I tell you that several of the millowners to the North of Ireland I have lately stated to me that they were quite willing to compromise this matter and see what could be done. All they wanted to do was to get Mr. Webb's consent to it. They are perfectly willing, and one gentleman said to me, "Will you take the position of arbitrator, and all the milling interests will be satisfied." I said I would not accept any such position. My advice was that, first of all, they should select two or three millers, or persons, interested in mills; next select two or three persons who are interested in fisheries; and then take the inspectors of fisheries, who are independent of both and look only to the public interests, to arbitrate between them. I am sorry I was not in a position to carry that out.

7218. You were not in a position to be put into a situation of that kind, were you?—No.

7219. Are you suggesting that Mr. Webb is in a minority of one?—I believe, from the conversations I have had, that Mr. Webb is leading the milling industry, and the matter is limited too, because I have known of some millowners who do not sympathise with Mr. Webb's views in this matter.

Mr. Fickerton.

7220. Will you name them?—I will not name them, Sir, but I state it as a fact that I have had these conversations. I know the unpleasantness of naming gentlemen.

Mr. Seton-Karr.

7221. It would be invidious to name them, I suppose?—Yes.

7222. I may take it as a fact that this agitation which has been started for the last two years against the Fishery Law is very local in its character?—Yes, very indeed.

7223. With regard to the protection of turbines, do you approve of the Cork grating?—Yes, that will decidedly protect fry and be easily cleaned, and be very inexpensive.

7224. After a very long experience, do you believe there would be any difficulty whatever in reconciling the milling and the fishing industries?—I have not the slightest doubt in my mind about it.

7225. It is simply a question of providing the proper kind of guard, is it not?—Yes, and a little give and take.

7226. And there should be, should there not, a proper kind of guard suited to the different circumstances of the different mills?—Quite so.

7227. Under those circumstances do you see any necessity for the passing of this Bill or a portion of it?—Not only do I see no necessity for it, but I think it would be most injurious to pass the Bill.

7228. Do you think it would be admissible to
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Mr. Seton-Karr—continued.

give the fishery inspectors a power of exemption with regard to turbines in the same way that powers of exemption are now given with regard to gratings?—I think it would be fair so far, in this way: I believe with this Lefel turbine, which is spoken of, it is generally felt that fish have more chance of getting through; and if a miller wanted to use a turbine, let him produce to the inspectors satisfactory evidence, which he could more readily do than anybody else, that the turbine is not injurious, or will not be injurious, to the passage of fry; then I think the inspectors of fisheries ought to give an exemption; and I think that would be a simple course.

7229. If they are satisfied that his turbine is not of such a form as would injure fry?—Quite so.

7230. But there are many precautions which might be taken by the millowner without much expense, such as putting in a bye-wash, for instance, are there not?—Yes. Mr. Webb has a bye-wash. I do not know if Mr. Webb's turbine does any injury. I do not say whether it does, one way or the other. I do not know anything about it, in fact. It was not our business as inspectors of fisheries to look into that. The Legislature having stated that the miller should adopt efficient means of keeping the fry out of the turbines, all our business was to see whether the Act of Parliament was being complied with. It was not our business to see whether the turbine was injurious or not, and we had no means of ascertaining that. But if Mr. Webb's turbine is not doing any injury to the fry, and the fry come, as I believe they do, in quantities down his head-race, he has a waste-gate or a bye-wash, and when the mill is not at work he can open that, and all the fry can go right through into the river safely. That is one of the cases in which I think inspectors of fisheries ought to have the power of giving exemption, always letting the man who uses this motive power prove to their satisfaction (and I do not think that is too much to ask) that he is not going to do any injury to the public.

7231. In the early part of your evidence you reminded the Committee of the distinction between questions of gratings and questions of lattices or guards to protect turbines. Now, I take it, that the question of prevention of smelts entering turbines is of far more importance than the question of gratings at head-races?—Yes, far greater; because in one case you are protecting the young, the little boys and girls that will be all men and women; you are not protecting the old men, who have laid the seed. They may be destroyed. I may be killed, but my children may increase and multiply; and it is the same thing with the fry; destroy your fry and you destroy your salmon fisheries. You may kill your spent fish, to a certain extent, with impunity.

7232. Therefore it is a question of supreme importance that fry should be protected where turbines are proved to be dangerous?—Certainly.

7233. The question of protecting spent fish is quite unimportant as compared to the other, is it not?—It is, compared with the fry.

Mr. Seton Karr—continued.

7234. And is this a question of some modern importance; turbines are coming now into much more general use than they were a few years ago, are they not?—They are. I mentioned a matter as to Mr. Young, and in looking over my notes in the evidence you will find Mr. Webb says, in regard to this turbine of Young's, that Young has gratings up there, but that they are similar to his. Now, they are not similar to Mr. Webb's gratings. They are one-half to five-eighths of an inch.

7235. What are Mr. Webb's?—Mr. Webb's are an inch-and-a-quarter, or something of that kind; I did not measure them.

7236. There is all the difference in the world between them, is there not?—One is a safeguard to fry; the other is not at all. I think, if you refer to Questions 232 and 237 in Mr. Webb's evidence, you will find something about it.

7237. He is asked, "Is it a fact that they have bad gratings and nettings erected there continually?" and he says, "Yes, I believe they have." Are those the gratings of one-half of an inch to five-eighths?—Yes. Now will you read Question 237? Mr. Webb says, "He" (Mr. Young) "has gratings, of course, as I have." He has not.

Mr. Macartney.

7238. He has gratings put before his turbine, has he not?—Yes, but not the same as Mr. Webb's.

Mr. Seton-Karr,

7239. Question 238 clears it up: "But the netting is taken away, you say?—Yes. He found it stopped his place again and again, and he then worked it for a length of time by keeping it open underneath the water as if it were down, but the water was passing underneath instead of passing through the netting."—That is so.

7240. I understand from you now that at the Fenaghy works they have got one-half to five-eighths of an inch gratings, instead of gratings of one inch or over as at Mr. Webb's?—Quite so.

7241. There is all the difference in the world between the two, is there not?—Yes; one protects the fry and the other does not.

7242. As a matter of fact, although Mr. Young has taken away his netting, he still has his grating left which keeps the fry out?—Yes.

7243. Mr. Webb has not a grating which keeps fry out, has he?—No, that is the difference.

7244. Mr. Young has never complained of the existence of that grating, has he?—No. The lessee of the mill told me the other day that he put it up for the protection of the turbine itself, and not for the fry, and that it did not affect the water-power.

7245. He had a lattice down which he took away, had he not?—Yes, he had, and he was told there was no necessity for it; the water bailiff told him not to put it down again.

7246. There would be all the difference in the world between a 1-inch and a $\frac{1}{2}$ -inch grating, would there not?—Yes; the fry would go through a 1-inch grating.

7247. Is

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[Continued.]

Mr. Seton-Karr—continued.

7247. Is the five-eighth the maximum which you should have for safety?—Yes, it is the maximum, certainly. I think it ought to be from one-half to five eighths; but certainly that would be the maximum.

7248. Apart from the points you have already alluded to in this proposed Bill, do you think the scope of the Bill is wide enough, or are you of opinion that a Bill dealing with the salmon fisheries of Ireland should cover the whole subject, and should be brought in by the Government?—Certainly. I think it is a great pity that we should have these little riders tacked on to Acts of Parliament, making confusion more confounded. It would be far better, as we have recommended over and over again in our reports, that all the amendments should be made, and the matter taken up by the Government.

7249. And I understand you to say that it is a great mistake to make this a question between owners of private fisheries and owners of mills?—Certainly; I think so. I speak as a public officer perfectly independently. I speak, as I said before, for the consuming public and the employed public, and those are the public interests which should be looked to. Proprietors of mills can look to their own interests, and proprietors of fisheries also; but I say it is the duty of a Government Department to look to the public interests and see that they are not injured at all, and that they should be increased and promoted as much as possible.

7250. The question of public interest in this case is far greater than the question of private millowners or fishery owners, is it not?—Far greater. Look at our great Shannon and Waterford and Wexford fisheries, all public property. It is only when you go to one or two rivers in Ireland that you find private fisheries.

Mr. Macartney.

7251. Are there no private fisheries on the Shannon?—The whole of the Shannon is public water, speaking of course of the tidal water, except at the Lax Weir Fishery.

7252. The tidal fishery is of course public?—It does not follow; because there is one tidal fishery in the Shannon, which is a several fishery.

Mr. Seton-Karr.

7253. I suppose you rest the case of public interest on two grounds; first, food supply; and secondly, the employment of the people?—Certainly; I think the employment of the people is very very material for the benefit of the country. I think the food supply is also very material, and it brings in great wealth to the country. If you destroy the salmon you cannot put food into the mouths of the people. You deprive people of employment and injure the country. Instead of seeing 10,000 people employed I want to see 20,000 people employed; and I am sure both industries can be carried on if there is a little give and take. If two men of common sense were to come together, I am perfectly convinced they would settle the whole thing.

7254. If this Bill is passed are you of opinion that very great injury will be inflicted on one of the industries of Ireland?—Yes.

Q.80.

Mr. Pinkerton.

7255. Could not Mr. Webb and you settle the difficulty; you are both men of common sense?—I should be very happy to do anything, but I am afraid I should not have much power with Mr. Webb.

7256. You are rather hopeless of Mr. Webb, are you?—That is so; I try to act courteously with every man; I have tried for a number of years to do my duty, and I have the interest of the country at heart in every way; but when a gentleman chooses to try and make me his perfect slave in such a discourteous manner, I do not think I can expect much of him.

Mr. Macartney.

7257. I understand that one of your objections is that this is a piecemeal Bill?—That would be an objection to any Bill.

7258. That applies to nearly every fishery Bill, does it not?—Certainly.

7259. I suppose you recollect the fate of the last general Bill which was brought in by private members in 1862?—Yes.

7260. Do you remember what the Select Committee did with that Bill namely, that it cut out all the consolidation clauses?—I remember it perfectly well.

7261. They played general havoc with it, did they not?—In that 1862 Bill the original clause was introduced by Mr. McMahon with regard to these turbines.

7262. On the question of your idea of compromise I agree with you, and I think you stated it fairly to the Committee; these are two important industries?—I wish I had you on the banks of a river; you and I could settle it easily, you seeing on the part of the millers and myself on the part of the public.

7263. What I want to put before you is this: You say you think a workable arrangement could be arrived at between the two interests, with regard to the question of the turbine clause; you have stated that you think exemption might very well be given there on the same lines that exist with regard to the grating clause?—I think it would be only fair; I think it is very hard if I choose to put up a turbine, which I am ready to prove will not be injurious to the passage of fry; and you put up a turbine that is injurious, and can be proved to be injurious to fry, that I should be placed in the same position as you, when I am not doing any injury, and you are doing an injury. I do not think that is exactly fair.

7264. Do you not see some little difficulty probably in proving a negative here?—No, I think not; I think there would be none. Let us leave Mr. Webb for a moment.

7265. I am taking the general case?—I do not mean anything personal. Let us take any mill. What simpler thing can there be. A miller has all the opportunities that no public board, either the public board of conservators, or the public board of fisheries in Ireland, have of knowing whether his wheel is doing injury. His men are on the spot. If the Government choose to say to the inspector of fisheries, you shall have the power to give exemptions to mills which are proved not to be injurious; it is very easy for any gentleman owning a turbine to make experiments

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Mr. Macartney—continued.

ments and carry them out for three or four days; mine had to be done necessarily in a very quick manner, and in a very limited time. He can then send notice to the inspector of fisheries; and from my knowledge of my colleagues when he gives notice that fry are coming down, and will have these experiments made, the fishery commissioners will satisfy themselves by summoning the bailiff there and then, and finding out practically whether the mill is doing any injury or not; and if the miller gives that evidence they will give him exemption.

7266. Is that one of the forms of arrangement which you think would be fair and satisfactory to both parties?—Yes, I think so. In fact in other words: do not allow anybody to do injury to another.

7267. With regard to your experiments, who had you there besides Mr. Caille and Mr. McDermott?—Mr. Gray, our engineer.

7268. What made you bring Mr. McDermott from the north?—Because I could not get anyone skilful enough to work this large net. It is a very difficult job.

7269. Was he working this net the whole time?—He and I and everybody. We had more employed also; I had seven or eight men.

7270. Where did you get the fry from?—At Lucan. Captain Cane, who lives at St. Woolsteas, provided the fry, and we had very great difficulty in keeping them alive.

7271. They were in a very weak state, were they not?—Fry very easily die.

7272. They were not at all in a condition that fry would naturally be coming down a river, were they?—They were coming down when they were taken out.

7273. At the time you made the experiment they were not in good condition, were they?—They were the finest fry I ever saw, because they were taken out of the river; they were not near the turbine at all when they were taken out of the river. The only injury they could get was by carrying them in a very large tank, nearly double the size of this table, and being put on a float with a horse and three or four men to cart them along.

7274. Then you say it would not be correct to describe the fry as being in a weak state?—Not at all.

Mr. Pinkerton.

7275. Did you find any of the fry dead in the tank before you tried the experiment?—Yes, there were lots of them dying from the heat; they were dying on the road.

Mr. Macartney.

7276. When you put them into the river did you put them in above the grating?—No, that was not my experiment. I put them right over the shaft, so that they should go down the turbine.

7277. You can give no evidence to the Committee as to whether they would have gone through the bars of the grating?—No; that was not my experiment.

7278. Do you know that it is one of the contentions of the millowners that the fry will not go through the bars of the ordinary grating that is up?—Yes, I know that.

Mr. Macartney—continued.

7279. But you made no attempt to satisfy yourself on that point during all these experiments, did you?—No, because I am too clear about it.

7280. How do you mean; have you ever seen them go through the bars?—Fry?

7281. Yes?—Do you mean into a turbine?

7282. Have you ever seen them going in through the bars before a turbine?—I have seen them going through similar bars into a head race.

7283. Have you ever seen them go into a turbine?—No.

7284. Were you aware when you went to make those experiments that that was one of the contentions before the Committee?—Of course I read the evidence.

7285. Were or were you not aware of that?—I read the evidence and know what was stated.

7286. You know that it is a contention, and an important contention, of the millowners?—I must tell you candidly that I did not treat it as important.

7287. What were you carrying out these experiments for; to prove one side of the case or not?—Certainly not. My experiments were simply to prove whether turbines would kill fry or not; nothing more; that is all I ever proposed.

7288. But you carried them out, knowing it was a very important contention on behalf of millowners, that fry would not go through, owing to the vibration?—Yes.

7289. And yet you did not at all attempt to satisfy yourself upon that?—No; that would take a very long time to do, and I never proposed it to the Committee. But do not imagine for a moment that it was because my experiments were partial. I only proposed to the Committee that the fact should be known whether the turbine killed fry or not.

7290. Did you see Mr. Hill before you made any experiment at his mill?—Yes, I saw him twice.

7291. Had you any conversation with him?—Yes.

7292. Would it be a correct report of that conversation to say that you were anxious to see this Bill pass, and that you came in the interest of the millowners?—Never, or to any mortal. If anybody has stated that I say it is a most wilful falsehood.

7293. Did you ever state anything about the Bill at all to him?—I do not think I had any conversation about the Bill at all.

7294. Were the smolts in a better condition when you arrived at Hill's mill than they were at Sherkleton's?—They were all in the same condition.

7295. Was it a fact that one of the men assisting you had to put his hand into the can and stir them up, and said it would do them good?—Never.

7296. Was any remark made as to the condition of the smolts?—We gave some away dead to the people.

7297. Was any remark made by anyone who was present as to the condition the smolts were in before they were put into the turbine?—No, not that I remember; I did not hear any.

7298. You

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Mr. McCarthy—continued.

7298. You did not hear any remark of the kind?—No, none whatever.

7299. Were any of the heads of the firms present at these experiments?—Yes, Mr. Shackleton was present.

7300. Was Mr. Hill present?—No, he was out hunting, I think, on that day; but no one could be kinder or more cordial than Mr. Shackleton, and Mr. Hill, and Mr. Wooky, all on the Liffey, and also Mr. Duff, and Mr. Dinmore; everyone but Mr. Webb.

7301. Do you say that these fry that were put in at Wooky's Mill were vigorous fry?—Yes, certainly. I am reminded that Captain Cane and I had a conversation about the fry, and I said, "I never saw such fine fry; is this a specimen of the Liffey fry; do they all run like those?" and he said, "I am afraid it is some of my poor fellows I have brought from another river." He has been spending money in bringing ova from another river.

7302-3. On all these occasions the fry were put in immediately over the turbines were they not?—Yes.

7304. Were they just thrown in?—They were poured out of the can in some cases by myself.

7305. Did they immediately pass into the turbine?—Yes, that was my object, so that they should have no escape except to go through the turbine.

7306. You have given me the number of fish that you recovered alive and dead on each of the occasions when you tried this experiment; was there ample opportunity for fish that came away alive or dead to get away without your getting them?—In one, at Coagh, there was, and one at Shackleton's.

7307. Do you think it was so at Hill's?—I went as close to the turbine as possible.

7308. Are you certain you went close?—No one can be certain, but I think nothing could have escaped at Hill's. I got such facilities at Hill's, the manager doing everything he possibly could to help me. I had Mr. Caille with me too.

7309. What was he doing?—Just like myself, examining.

7310. Did he see you put them in?—Yes, and immediately I put them in he came down with me to the front to see whether any fry came through or not.

7311. At these experiments at Luncan the only person who came from the North of Ireland was Mr. McDermott. As to the experiments at Coagh Mills, what notice did you give to the Mill Owners Association?—I never gave them notice.

7312. So that they were totally unaware you were carrying out any experiments at Coagh?—Mr. Dinmore wrote to me on the 11th May. Mr. Dinmore took umbrage that I ignored a letter of his of the 28th April. I explained that I regretted it, and then he wrote to me, in reply to my letter of the 11th May, to the effect that he gladly acknowledged that he was too quick in forming his opinion of my former letter, and was more than satisfied with my explanation, &c., &c.; that the water was so short there that turbines were not being used at present, but they were relying on steam, &c. Meantime the expense 0.80.

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riment could not be tried. On the 11th May he wrote a second letter (same day) informing me that he had written to a friend at Coagh, Mr. James Duff, who had turbines on a much better river, and that he was sure one or two of them were going, and enclosed me a telegram from Mr. Duff to him, as follows:—"Will allow fry to be passed through turbines." This was received by me on 12th, and same evening I started for the north, having first wired to Derry for men who were well versed in fixing nets to meet me with fry on morning of 13th.

7313. So that, having received a telegram on the 12th, you immediately started for the north. There was nothing to prevent you starting that morning?—That night.

7314. And you telegraphed to Derry for Mr. McDermott, I suppose?—Yes, and I brought the nets down.

7315. But you gave no notice whatever to the Millowners' Association or to any other mill-owners?—No, I did not in any case.

7316. In your first experiment there were three uninjured fry; and in the second experiment you saw two fry afterwards, I understand?—In the first experiment we got nothing.

7317. I thought you said there were three uninjured?—No; when the turbine was stopped we saw three fry swimming very quietly above the turbine.

7318. I thought that was the experiment with the McAdam turbine?—No; the McAdam is where we got two fry.

7319. Did you capture anything dead there?—No.

7320. How many did you put in there?—Thirty, I think it was.

7321. What do you suggest became of the balance of the 30 which you did not see swim about?—It is hard to say.

7322. Were they swallowed by the turbine?—I would not say so; I would not say anything extreme at all, one way or the other. I do not know; it is impossible for me to say. No man could have carried out the experiment with more anxiety or taken greater trouble to settle this point.

7323. The strong probability is they are alive now, is it not?—When I got so few of them, it struck me that they went into the deep water, which is always below a turbine, where you cannot get at them, and that they might have been dropped down there, when they got out of the turbine, instead of being carried down. If they came down alive I would have got them; they could not have escaped my net at two places, namely, at the experiment I made at Coagh, and the experiment I made at Mr. Hill's.

7324. When you were alluding to the experiments you desired to carry out at Mr. Webb's, I think you said that on the 11th May, you got a letter from him to say that he expected to see you and your fellow commissioner here on the 13th; that would be the following Friday?—Yes.

7325. You did not come here, and you did not see Mr. Webb, did you?—Quite so.

7326. You then paid a visit on the 14th to his mills?—Quite so.

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7327. What

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7327. What object did you go with; did you expect to carry out experiments?—No, I went to find out the breadth of his tail-race, so that I would have the nets sufficiently large. I knew my net, though 12 feet wide, was too short for Mr. Shackleton's, and I knew it would be ridiculous to go there and find his race was too wide.

7328. Could not you have ascertained that in any other way when you were so hurried?—No, because I had done my experiments at Cough, and I was returning on the 14th May.

7329. Can you suggest to the Committee any reason why you should not have consented to Mr. Webb's proposals to carry out the experiment on the following Tuesday, the 17th?—Because I had no nets to do it.

7330. But the nets were made available afterwards by wire?—They were made available for me, not for Tuesday, but for Wednesday.

7331. Why did you not go on the Wednesday?—Simply because I received a discourteous telegram, and then Mr. Webb required me to leave home at 6 o'clock in the morning.

7332. You had told him previously you would not carry out experiments, had you not?—No. I said I could not, because I had no nets, and I knew perfectly well that Mr. Webb would not know what kind of a net would be required. My net could not be made in Dublin or Derry. There was only one place I could get it from, that was Cork; and then I had to employ a man to make it in my own garden, in accordance with my directions.

7333. Between the Saturday and the 17th, occurred this unpleasant interchange of correspondence between you and Mr. Webb which placed you in such a position that you felt that though you were in charge of public money, and though you were investigating, for the benefit of this inquiry, you must decline to go down on the 18th?—I could not have gone down, except I started at 6 o'clock in the morning; and my nets were not ready.

7334. He said he had nets?—But I would have been wasting public money if I had gone then.

7335. Why could you not try his nets?—Why should I be wasting public money? If I had failed I should have been wasting public money. I was commissioned to carry out an experiment, and I must carry that out as I considered best, and not trust to anybody else. I am responsible for it.

7336. Therefore, your responsibility weighed so heavily upon you that when you got a telegram from Mr. Webb, saying there was no difficulty in getting to London, and that he would provide netting to catch dead fish, you did not think fit to carry out the experiment?—I did not want to catch dead fish. If I used the net that would catch dead fish, and not catch living fish, the miller would very naturally, and I think very properly, say, "why your net killed the fish; it was not the turbine."

7337. Could you suggest a net that would not catch living fish, but would catch dead fish?—Certainly.

7338. Have you them at the office in Dublin?—No; but I know perfectly well one would be open to a charge of that kind, if by any means

Mr. Macartney—continued.

one could hold a net taut across a tail-race where there was a rush of water and fry impinged against it and got killed.

7339. Do you suggest that was the operative reason with you in declining to go down on the 18th?—It was the only reason, I assure you.

7340. That you were afraid that you would be under that charge?—I did not dream of any charge at all.

7341. I think you said you did?—I said so, but the only thing that operated in my mind was that I had not the nets, they did not arrive to me from Cookstown till Tuesday. I had a man all day on Wednesday and Thursday over hauling and repairing and adding to them, and I bought 27. worth of nets on Thursday.

7342. But you were offered nets?—I would not accept them from anybody when I was myself charged with the work.

7343. Your view of your own experiments is that they do not give any absolutely conclusive information?—No, certainly not.

7344. Now I want to ask you a question on the Act of 1842 and the Act of 1869 combined. Section 4 of the Act of 1869 brought into operation as against the mill owners the other Act, did it not?—Yes.

7345. Under the operations of those two Acts it is within the power of the Board of Conservators to call upon millowners to erect at the intake of their head races, gratings, and lattices. I will give you the clause?—I know it perfectly well; you mean the 76th Clause.

7346. About the Board of Conservators?—That is not exactly the clause, because in 1842 we had not Conservators.

7347. At the present moment the conservancy board can call upon millowners under those two combined Acts to erect at the intake a grating and a lattice, can they not?—Yes, or proceed against them.

7348. And unless they get an exemption from Inspectors of fisheries they could oblige them to put up a lattice which would be an effectual fry guard at the intake?—I think that is the law. I think the section of the Act of 1868 embraces the question of lattice; but I think there is a difference of opinion about it, though I agree with you.

7349. Independently, therefore, of the Turbine Act altogether, and assuming that to be the correct view of the law, there would be an effectual protection against fry entering a race feeding a turbine, under the 1842 Act, would there not?—Yes, if the lattices were enforced, which would ruin the mill.

7350. Are you aware that Mr. Webb was prosecuted for not putting up a wire netting there?—I am not aware of it. He may have been, but I rather think he was summoned for not having put up gratings. Mr. Hornsby and I considered Mr. Webb was, I was going to say harshly, but at any rate not judiciously treated.

7351. You have very frankly expressed to the Committee your view that the gratings at head races (and I presume that would cover lattices), would be extremely injurious?—We have never had lattices anywhere.

7352. And

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Mr. Macartney—continued.

7352. And in this district of the Maine you have given exemptions pretty freely, have you not?—Yes.

7353. Therefore the turbine would, under certain circumstances, as you have admitted to the Committee, operate injuriously upon the mill-owner and the working of his mill; I mean in a case where you were of opinion that a lattice at the headrace would injuriously affect him; a lattice before his turbine would also injure him?—To a certain extent; but you see in the one case I think it is a hardship, and in the other case he is only protecting the fry and can be let off except for a very short time in the year.

7354. One question about the prosecution of Bandelstone; you said you had received an application from Mr. Webb with regard to these gratings, and that he had said he was going to send you a further communication?—Yes.

7355. But that you did not go to inspect because you had received nothing further from him?—I meant our department when I said "I."

7356. I think you said it was in March that you received the application from him; on the 6th of March 1891, the following letter was written by Mr. Dowling, your secretary: "No. 3154, to Mr. C. J. Webb. Sir,—I am directed by the Inspector of Fisheries to acknowledge the receipt of your letter of the 2nd inst., claiming an exemption from the necessity to erect gratings at your mill, and to inform you that an inspection will be made as soon as the business of the department permits."—Yes.

7357. That would lead anyone to imagine, would it not, that on the very first opportunity the Office of Fisheries would send down?—We would not wait further reports.

7358. I understood to-day that your observation was that you did not inspect immediately, because you were waiting for further reports?—I am sorry if I led you to think that; because I do not think either I or my colleagues would wait for a further communication, when we felt we ought to go and do a thing. We do it as quickly as ever we can; and I find we went on the 9th of May. In the meantime Mr. Webb had been summoned.

7359. Your first printed notice about turbines was issued in 1890, was it not?—Yes.

7360. Can you suggest to the Committee why there was no notice taken of turbines before, if they were so very injurious as you imagine them to be?—I cannot. I think really that that notice arose in consequence of the complaints that we were receiving as to the falling off of the fisheries in the River Bann. There is no doubt, the River Bann has been declining for some six or seven or eight or 10 years in fishing; that it has gone from bad to worse; and I think that was the cause of it. When that clause as to turbines was passed I was secretary to the Commissioners of Fisheries.

7361. The Turbine Clause came into force in 1863. In 1862, Mr. McMahon brought in his Bill; it was referred to a Select Committee, and you were examined before that Select Committee, were you not?—I was.

7362. I think you were the only person who went into the question of injury to fish from

Mr. Macartney—continued.

turbines. I have read the evidence?—I agree with you (*after referring to a Report*) I am the only one, I think.

7363. And your evidence as to the injury to smelts was entirely based, I think, upon the Cork Water Works case?—Yes; I saw them dead myself.

7364. The other persons who were examined before that Committee were entirely fishery owners or persons representing the Fisheries of Ireland, were they not. There was no representative of the milling interest before that Committee; was there?—I think not.

7365. So that from that point of view the evidence was of an entirely one-sided character?—The evidence was merely as to facts.

7366. It was on facts from one point of view?—There was no "either side" in the matter at all; it was only a question of fact whether the fry were killed or not.

7367. But that was not before the Committee. You remember there was no turbine clause in the Bill?—Pardon me; there is.

7368. Will you point it out to me?—I took a great interest at the time with regard to that Bill, and I have all the original papers. You will see what I say in 1862, in reply to Question 1315, at page 78. "Now the next clause relates to the placing of proper gratings to prevent the destruction of salmon by reason of mill machinery." So that the Committee must have had the Bill containing that clause before then.

7369. Not the turbine clause?—Yes; here is a copy of it; I made it myself and I will trace it up for you. In 1863 the Government brought in a Bill omitting that.

7370. A Committee sat and reported, and I will have the Report here directly. In 1863 the Government, after that Committee sat, brought in a Bill which did not contain the turbine clause; did they not?—That is so.

7371. And that turbine clause was inserted in it in the Commons by Mr. Leader, I think?—Yes; in the House of Commons; and in the Lords by Lord Fernoy.

7372. But the Government, notwithstanding the fact that they had your evidence before them, did not insert the clause?—That is so. I copied this clause myself out of a Bill brought forward by Mr. McMahon, Mr. Brady, and some one else (*producing a document*).

7373. Is this the clause which you say is the turbine clause?—Yes; Clause 18.

7374. That is not what I call the turbine clause; that is merely a clause as to gratings used as wheels for the purpose of supplying towns with water?—This is the clause.

7375. Is there a turbine there mentioned. The turbine clause of the Act of 1863 was never in the Bill of 1862, was it?—No; it was this clause.

7376. The turbine clause of the Act of 1863 was never in the Bill of 1862, either when it was before the Committee or after they reported, was it?—No; it was the grating clause.

7377. But that grating clause does what?—It perfectly protects salmon descending to the sea. It was in Mr. McMahon's original Bill that

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went before the Select Committee, and upon which I was examined.

7378. I am quite agreed. The turbine clause was not in Mr. McMahon's Bill; it was not put in on the report of the Committee, but it was inserted in the House of Commons afterwards by Mr. Leader?—Yes.

7379. It was not introduced by the Government, was it?—No; this clause in Bill No. 47, which was before the Committee, had exactly the same effect, but it embraced all mills.

7380. Generally speaking, you have told the Committee that there has never been a stringent application of the grating clause in Ireland?—I think not.

7381. Have you found in your experience any stringent application of the turbine clause?—I cannot answer your question as to the turbine, for this simple reason; because it is not our duty. We are not the bailiffs to enforce the law.

7382. At all events, since you have been fishery inspector, if there had been anything like a bother of this description between the Conservancy Board and millowners, you probably would have heard of it?—Very likely.

7383. Are you aware that the Conservancy Board of the Hann took no steps to enforce the turbine clause until the year 1889?—I think more shame for them; I think it is a disgraceful thing for any man holding a public office, although it is an honorary office, to allow any breach of the law by anybody. I would enforce the law against my father.

7384. Do you think that the condition of affairs at the present moment is satisfactory in that district?—I do not think so.

7385. I am not talking now of gratings, but, practically, with regard to the turbine clause, there is a defiance of the law; it is not in operation, is it?—I have heard so before this Committee; but I have never heard it before. My answer to you is this: that I would not allow anybody to set the law in Ireland at defiance. If we have bad laws, change them.

7386. Your view is that a good deal of this difficulty has originated in friction between the two parties, which might be avoided by a proper system of give and take, is it not?—I am perfectly convinced of it.

7387. You have suggested one element of the give and take which you think would be satisfactory to all interests, do you not?—That is my idea.

7388. And you think it would be very carefully administered by the inspectors of fisheries in the interests of both parties, do you?—That is my idea.

7389. And having regard to what has occurred recently, do you think it would be advisable that some reasonable settlement should be made by the Legislature?—Most undoubtedly, and I would be quite prepared to do everything in my power to effect that, and bring it about.

Mr. Pinkerton.

7390. You are, I understand, in favour of a compromise in this case?—I am.

7391. And you think that where there is, say a Hercules turbine, exemption should be granted, do you?—Any turbine; it would not do to adopt

Mr. Pinkerton—continued.

any name because it would be giving a premium to potentates.

7392. Do you hold the opinion that powers should be granted to fishery inspectors to make distinctions between those that did not destroy fry, and those that did?—Certainly; and there would be no unpleasantness. I would say to the miller simply, "If your turbine is not injurious, and you can prove it, we will give you an exemption."

7393. You are aware, are you not, that some Parliamentary notice must be taken in order to give the fishery inspectors that power?—Yes.

7394. Therefore you are in favour of Mr. Macartney's Bill passing in a modified form, are you not?—I am not in favour of it passing. This morning I tried my best to see how I could alter the Bill; I studied it very carefully, and I do not see how I can. I was at work before eight o'clock this morning, and I have here a very rough sketch of a section which I suggest myself. In this I provide that, wherever a turbine is used, a grating like this, or a little larger, shall be put up, or a submerged trough, or something else that would have a similar effect. Then I would give power to inspectors of fisheries to provide any substitute for the millowner that would have the same effect. Then I would give inspectors of fisheries power to give exemption to any millowner who could prove that his turbine is not injurious.

Chairman.

7395. Does not that power exist at present if they go before a magistrate?—No.

7396. The fishery owner has to prove that injury is done, or naturally the magistrate will not enforce the law, will he?—That is not a fair position for the millowner or either of them to be in; it is not fair for the milling interests or the fishing interests. It ought to be settled; and I am quite sure it can be done.

7397. As I understand it, you wish to replace the magistrates by fishery inspectors, do you not?—No, I do not; I would be very sorry to do that. In the one case you have this: I must prove to the magistrates that the millowner is using a mill that is destructive to fish. How do I do that? The bailiff comes up and says, "I found these dozen fry in Mr. Webb's or anybody else's race;" immediately a summons is issued, and it becomes a question for the magistrates to say if this killing of 12 fish is a thing which is injurious; the magistrates may say "Yes, it is"; that is quite sufficient to do it. Then the miller is convicted.

Mr. Pinkerton.

7398. And that creates a kind of friction, does it not?—Yes, which ought to be avoided.

Chairman.

7399. But the Recorder of Belfast has decided, has he not, that it must be proved by expert evidence?—Yes.

7400. And he would call you in, I suppose?—But I am going farther than expert evidence; I am going to the actual fact of a certain number of

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Chairman—continued.

of fry having been found in the tail race; and the magistrates would say: "That is quite sufficient for us to convict." If they did that the county court judge would confirm that conviction; and then look at the position the miller is in. Now, I want to save the miller from any annoyance. I wish to say that in the course of making these experiments I had several conversations with gentlemen who possess milling properties in the country, and I had it from one

Chairman—continued.

gentleman, that as far as his mill was concerned, he was quite prepared to put up a $\frac{1}{2}$ in. or $\frac{3}{4}$ the inch grading, and it would do him no injury. I cannot tell the Committee that gentleman's name, because I asked him if I had liberty to mention it to the Committee, and he said, "If Mr. Webb will give you permission to make that public to the Committee, you may." But Mr. Webb will not give me the permission, and I cannot do it.

Friday, 27th May 1892.

MEMBERS PRESENT :

Mr. Cox.
Sir John Whittaker Ellis.
Mr. Hewier.
Mr. Macartney.

Mr. O'Neill.
Mr. Seton-Karr.
Mr. Tomlinson.

SIR JOHN WHITTAKER ELLIS, BART., IN THE CHAIR.

Sir THOMAS BRADY, re-called ; and further Examined.

Chairman.

Mr. Seton-Karr.

7401. I UNDERSTAND, Sir Thomas, that you wish to correct a statement which you made at our last meeting?—Yes. In answer to Question 7191 I said to the honourable Member for the County Antrim that Mr. Young's bars were $\frac{1}{4}$ to $\frac{1}{8}$ ths of an inch apart. I was in some hesitation about it. I was absolutely reading from my note-book. But I read it wrongly. I wish to correct it to half an inch.

7402. Is the $\frac{1}{8}$ th correct?—Yes, they are from $\frac{1}{4}$ to $\frac{1}{8}$ ths of an inch.

7403. In answer to a question of mine you said the same thing ; does the same correction apply?—Yes. I do not know how I made the mistake.

Sir GEORGE T. POLLEXFEN, called in ; and Examined.

Mr. Macartney.

Mr. Macartney.

7404. ARE you a grand juror and justice of the peace for the County Sligo?—Yes.

7405. Are you a member of the firm of W. and G. T. Pollexfen and Company, millers and merchants?—Yes.

7406. Are you a director of the Sligo Steam Packet Company and a member of the Harbour Board of Sligo, of which you were chairman last year?—Yes.

7407. Do you give very considerable employment in the milling industry?—Yes.

7408. Will you state to the Committee what your wages paid last year were?—Last year the wages paid by my firm amounted to 7,000 £.

Chairman.

7409. Are those wages paid to mill employés?—I calculate that 2,000 £. of that would not be properly chargeable to milling ; the other 5,000 £. would.

7410. What is the other 2,000 £. applicable to?—We are engaged in other businesses, such as guano agents, and other things.

7411. But you pay 7,000 £ a year for wages, do you not?—Yes.

7412. Is all that appertaining to those mills?—What I say is that about 5,000 £ would be strictly attachable to the milling, and 2,000 £ to the other branches of the business.

Mr. Seton-Karr.

7413. What do you call your business?—Millers and merchants and ship agents.

7414. Will you give the Committee an estimate of your importations of grain last year?—Last year we imported direct 36,000 tons of maize, and the year before about 45,000 tons.

7415. You have two mills, have you not? one at Sligo, and the other at Ballisodare?—Yes.

7416. What did you grind last year?—We ground maize in both.

7417. What amount?—We ground out of the 36,000 tons imported, 13,000 tons in our own mills.

7418. What was the total value of the meal ground in the district last year? Can you give me an estimate of that?—Yes. I can easily get the estimate, because that 36,000 tons was all turned into meal in our district ; the value of it was 250,000 £.

7419. That was all ground in your district, was it?—Yes.

7420. What was the proportion in money of that ground in your own mills?—About 90,000 £.

7421. Have you two turbine wheels at Sligo?—Yes.

7422. And have you any gratings or protections in front of these wheels?—Yes ; I have a model of the grating which I can produce (producing a model).

7423. What is your opinion of the effect of this on the working of your turbine?—It is very injurious to our power and speed, and the cut of the meal at times when the water is low, which is generally in May and June.

7424. What

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[Continued.]

Mr. Macartney—continued.

7424. What is the width of the apertures between those bars?—Two inches.

7425. Would you put that up in any case as a protection for the wheel?—Yes.

7426. What are these things behind?—That is the fly-guard. This is a piece of the actual wire that we use (*producing sawe*).

Chairman.

7427. What is the mesh of it?—A quarter of an inch. This is put down in the months of May and June, as I say, when the water runs generally very low with us; and such is the stoppage by these small wire screens, especially when the weeds jam against them constantly, that we find the turbine, instead of being that very reliable power which it is intended to be, varies considerably; so that there is a constant irritation between our customers and ourselves about the cut of the meal, and they frequently leave us and go to the northern millars, because they say our wheat is not cut so finely as it ought to be. We also find it affect us in the quantity of meal we grind. If we have water to turn four pairs of stones with these screens down as you see them, we should have enough to turn five pairs of stones in place of four if they were up. That means five tons of meal in 24 hours additional. Of course we lose the grinding of that when the water is slack. We notice that the months of May and June are the worst times, because when there is anything to be done the millwrights say, if we do not get it done in May and June we will not get it done afterwards.

7428. Mr. Petrie told the Committee, in answer to Questions 3286-6, that in consequence of the erection of your turbines in the year 1878, much injury was done to his fishery; that the fry were killed in the two months, going down to the sea; and that the number of fish coming back the next two years was seriously diminished in consequence; and he said that one-half of the loss was caused in 1876, and one-half in 1880. Is that correct?—No, it is perfectly wrong.

7429. When were your turbines first erected?—There were none of the wheels put in until the end of 1878. We commenced putting them in about December. The masonry work was going on all through 1878. I think it right to mention that I was not there myself; but I find that from documentary evidence, from the books, and also from the men.

7430. When were your wheels first started?—I do not know quite, but the wheels were not in the mill until late in January 1878, or January 1879.

Mr. Seton-Karr.

7431. In what respect do you say Mr. Petrie is wrong?—He is wrong in the date, certainly by one year.

Mr. Macartney.

7432. He stated that the destruction through the turbine wheels took place in 1878; that the fry were killed in 1878 by these turbines, and the two following years the fishery was seriously injured in consequence?—The last of the work of putting in the wheels was not completed till late in 1879.

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Mr. Macartney—continued.

7433. Is he incorrect in stating, in answer to Question 3243, that you commenced work with the turbines in May 1878?—Yes, that is incorrect.

7434. And that you got stopped by a freshet one morning in June?—That is wrong; nothing whatever occurred of the kind mentioned there.

Mr. Seton-Karr.

7435. Did it occur the following year?—Never. I have the millwright here who was there all the time.

Mr. Macartney.

7436. Was your turbine always protected?—Yes, by the bars, before one of them was turned.

7437. Where were the fry-guards first erected?—The first lot of wire for the fry-guards was got in February 1879. I believe that particular lot was objected to on the part of the fishery people who said it was rather coarse, and another lot of wire was got immediately, and erected. The mill joiner, whose declaration I have here, says that the wire fencing which now exist he had put up before the first of the season commenced.

7438. In what year?—In 1878.

7439. Will you produce that; is he here?—No, I did not like to bring both the millwright and the joiner away, because now is a very important season.

7440. Is it absolutely incorrect for Mr. Petrie to represent to the Committee, that the improvement which he says took place, was owing to the fact that fry-guards were eventually put up and that at first your turbines were not protected?—It could not have had any connection whatever with it, because there was never any fry destroyed by the turbines.

7441. Will you read the declaration of the mill joiner?—Yes. It is dated 23rd May. "I, James Egan, woodworker and mill joiner, do hereby solemnly and sincerely declare that I have been for the past twenty years working in the Sligo mills. I recollect the turbines being put into the mills, and I worked fitting up the new mill for them when they were being put in. I am informed that a statement has been recently made that after the turbines started to work that they were stopped through being choked by fish, and that they killed salmon, salmon fry, and eels wholesale. But such a thing could not possibly occur, because an iron railing two inches apart between the bars was erected above the turbines before they were started and no salmon could pass between those bars, and before the following fry season I had put down the present 4-inch wire screens through which no fry can pass." These are the screens there.

Mr. Tomlinson.

7442. Does that mean a guard at the tail-race?—No, it is this work in front of the turbine.

Mr. Seton-Karr.

7443. No salmon going down the river could get into it, of course?—No. "I never knew of any salmon, salmon fry, eels, or fish of any kind whatever being killed by the turbines. I

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Sir G. T. POLLEXFEN.

[Continued.]

Mr. Seton-Karr—continued.

was constantly employed at these mills and such could not occur without my knowledge."

Chairman.

7444. Does he state from what date he was employed?—Twenty years; he is there now.

Mr. Seton-Karr.

7445. He declares, I see, that the fry screens were put down; does he mention in what year they were put down?—He merely states this; that before wheel was turned he had put down the iron bars, and before the fry season came on he had put down wire fencing. He does not say the year, but we fix the year by other evidence, from the books; and also the millwright is here who was working at the machinery. In point of fact when I asked the man about it he said, "I cannot mind months or years, but I know this positively that I had the wire fencing down before the fry came down because he said the old governor was at me eternally to have it done."

Mr. Seton-Karr.

7446. Before the fry came down the first year were the turbines put up?—That is what he means; he said he had the iron up before the wheels turned at all, and then that he had the wire across there before the fry came down.

Mr. Macartney.

7447. Is it correct to say that you got people from America erecting the mills and that they were in a hurry to start back again, and that you had neither gratings or lattices put up?—Perfectly incorrect.

7448. Did you ever get anybody from America?—No, our own millwrights, joiners, and smiths, of whom we have a sufficient staff, were quite sufficient to put up anything of that kind; we never had a man from America or anywhere.

7449. Mr. Petrie said that in May 1878 your wheels "commenced work; and in June, when the first freshet came down, they got stopped one morning. The men came for me and we got the sluices let down, and we found that they were full of the remains of fish; some of the tails and heads were to be seen. (Q.) What kinds of fish?—(A.) Fry and salmon, and some eels; the turbine could not move. (Q.) In other words it was choked with dead fish?—(A.) Yes, it was choked with dead fish." Have you made inquiries with regard to that?—I have made strict inquiry and no such thing ever occurred. I have two declarations here on that very point.

7450. Will you read them please?—The first is the declaration of Dominick Gillen, of Sligo, dated the 23rd of this month. He says, "I, Dominick Gillen, of Sligo, aged 75 years and upwards, do solemnly and sincerely declare that I was in the employment of the owners of the Sligo Mills for about 20 years as foreman and general overlooker; I remember the turbines being put up in the new mill. I never knew of any fish or fry having been killed by the turbines. I have been informed that a statement has been recently made, that the wheels killed so many fry and salmon, and eels, after they first started work, that they were choked and stopped, but such a thing never occurred to my knowledge. It could not occur without me knowing of it, as

Mr. Macartney—continued.

I was always about the mills and in charge of the work as foreman."

7451. Is that a statutory declaration too?—Yes, it was made before a magistrate of a county, and witnessed by myself.

7452. Have you any other declaration bearing on this point?—Yes, I have.

7453. Will you read that to the Committee?—It is a declaration by my father, who is too old to come here. It states: "I, William Pollexfen, of Rathedmond, Sligo, aged 80 years and upwards, do hereby solemnly and sincerely declare that I was a partner in the late firm of Middleton and Pollexfen, who owned and worked the Sligo Mills for a great many years up to 1882, when they were taken over by the present firm of W. and G. T. Pollexfen and Company. I remember the turbine wheels being put into the Sligo Mills, and was frequently in the mills when they were being erected, and after they began to work. I never knew of any fry or salmon or eels being killed by the turbines, and no complaint or report of such was ever made to me." I had to take the declaration myself as a county magistrate, because my father was unable to leave the house.

7454. Is your water taken by a mill-race?—There is no race at all; it comes in direct from the river.

7455. Then it is incorrect to say that there is very little fall, and that your mill-race is an ordinary mill-race?—There is no mill-race at all; it is perfectly incorrect.

7456. At Question 3274 Mr. Petrie asked: "Is the mill-race more rapid than other mill-races?—(A.) No; the water comes down very quietly. (Q.) It is an ordinary road?—(A.) An ordinary road. (Q.) Do you happen to know at what pace the water runs in that race; do you know the fall?—(A.) There is very little fall; it is an ordinary mill-race. I suppose there is not a foot fall in half-a-mile.

7457. There is no mill-race, as a fact, is there?—No, there is no race at all.

7457* Have you much difficulty in cleaning those fry-guards?—Yes, very great difficulty when the weeds come down. They are always coming down, but at some times thicker than others, and the screens have to be cleaned every hour; it takes 15 minutes to clean them, and during the cleaning there is an irregularity of speed which is very annoying indeed.

7458. What is your turbine?—A Lefel.

7459. What power do you develop?—I am not a technical engineer, and am not up to that kind of thing, but I can tell you what we grind. We drive six pairs of stones, and we very seldom can drive the six when these get jammed. This is a model of our turbine (*producing the same*). It shows a section, and an exact counterpart of the turbine wheel. This is a perfect bucket; the water comes in this direction, and falls down straight.

Mr. Seton-Karr.

7460. What is the clearance between the guides and the buckets?—When working at full speed?

7461. It has nothing to do with the question of speed.

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[Continued.]

Mr. Seton-Karr—continued.

speed, but of fixture?—It is about three-fourths of an inch.

7462. That is the clearance between this revolving wheel and the fixed part?—Yes; when that point passes here it would leave about three-fourths of an inch.

7463. Is that what you call the clearance?—Yes.

Mr. Tomlinson.

7464. Am I right in saying that part of the force of your turbine is gained by the water impinging on that?—Yes; this is the upper bucket, and this is the lower bucket. It is a double turbine (describing).

Chairman.

7465. The water first passes, as I understand, between these buckets and the outside casing?—Yes; there is an outer casing with what we call "gates" passing in that direction, to give a direction to the water, and it strikes the bucket we will say there; the wheel revolves, and the water drops down here behind. But in this lower bucket it goes down.

Mr. Macartney.

7466. Have you formed any opinion, or have you had any opportunity of making observations, as to whether it would be possible for fry to pass through your turbine. If you have not formed any opinion, I do not want to ask you?—I have formed the opinion that they will pass through quite safely.

Mr. Seton-Karr.

7467. Do they ever get a chance of passing through?—I have never tried any experiments, but if I was asked to give an opinion I should give that opinion.

7468. But the gratings have always been up in front of your turbines, I understand?—They have.

Mr. Macartney.

7469. Mr. Petrie dwelt very much on the amount of employment which was given in his fishery. I suppose you know the fishery?—Yes, I do.

7470. Is it true that he employs over 500 men altogether?—I do not see how that can be true.

7471. Is it generally believed in Sligo that he does?—No, it is not; I think there must be some great mistake about that; about 20 men are employed at the Sligo fishery in the operations of fishing; he may have some men at some other place: there are about four or five boats.

7472. Are you, as a millowner, prepared to give every possible assistance to stop poaching?—We have always given every assistance possible; I see Sir Thomas Brady present, and he knows that perfectly well. With regard to the fisheries of course that is a thing outside our business, but I know Mr. Petrie has some other small fisheries; a couple on the coast, and he would employ some 24 or 25 men additional there.

7473. Do you think the statement that he employed 500 was exaggerated?—I think there must be a mistake about that; I thought it was a misprint for 50.

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Mr. Macartney—continued.

7474. Question 3365 was put in these words: "As I understand, before the lattice you mentioned was put up there was an opening with bars, was there not," and he stated, "There was nothing at all"; is that absolutely incorrect?—Yes, absolutely incorrect.

7475. Then he is asked, "You described an alteration of the arrangement," and he said, "Yes; I telegraphed to the inspectors, and they came and put down two-inch bars right across before the turbine, and then they put the lattice down behind them, but they found it did not work and then they changed it to the outside." Is that a correct representation of what took place?—About the lattice it is; but about the bars it is not, in this respect: We know nothing about telegraphing to the inspectors, but we put the bars for own protection, because logs of wood and such things would smash the turbine to pieces.

Chairman.

7578. Were you present when the turbine was put up?—No, I was not; but the millwright is here who was; and I have read those declarations. I have stated that I was not there personally, but I have satisfied myself from inquiries and from the books.

Mr. Macartney.

7477. What I understand is this: that you put up these bars here, did you not, for the protection of your turbine?—Yes.

7478. That before the turbine began to work these gratings were put in?—So the men declare, and everybody there.

7479. There was an objection taken by the Inspector of Fisheries, I believe, to the first proposed fry guards that were put in, and then those that are now in position were fitted before the first fry season?—Yes; I do not know that the change took place before the first fry season, but a change has taken place at some time. They had been changed there from inside the sluice to where they are now, just behind the bars.

Mr. Tomlinson.

7480. Which way does the water come?—It flows in in that way (describing), and the sluice would be about here.

7481. What was the change of position?—These wires were first put down behind the sluice, and then altered, owing to some objection from the fishery people that the fry were being killed or injured against the face of the wire netting when the sluice was lifted, and the fry that were outside the sluice would be suddenly dashed up against the wire netting and get entangled in the weed and killed or injured against it.

Mr. Seton-Karr.

7482. That corresponds exactly with the answer given by Mr. Petrie to Question 3372, does it not? You do not deny, do you, that those fry were killed in that manner?—There was never one killed by the turbine.

7483. He has not stated so?—Yes, the pith of his evidence is that.

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7484. He

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[Continued.]

Mr. Macartney.

7484. He is asked at Question 3242, "Do you know of any injury done to salmon fry by those turbine wheels?—Yes. (2.) Will you tell the Committee what it was?—In May 1878 they commenced work, and in June, when the first freshet came down, they got stepped one morning. The men came for me and we got the sluices let down, and we found that they were full of the remains of fish; some of the tails and heads were to be seen?"—That is his statement.

Mr. Seton-Karr.

7485. But you do not deny do you, that the fry were killed against the sluice gates or the gratings when they were in the first position as you have described?—I do not deny that they were killed against their own wire screens, which they put there; but our machinery never killed them.

7486. I understand you do not deny that part of his evidence?—No, I do not.

Mr. Tomlinson.

7487. With reference to this last point which Mr. Macartney has put to you, I will read question and answer 3342: "Do you know of any injury done to salmon fry by those turbine wheels?—(A.) Yes. (Q.) Will you tell the Committee what it was?—(A.) In May 1878 they commenced work." That date I understand you to say is wrong?—I was not there personally myself; but I find from the books recording the materials got, and the evidence of our workmen, that the work of building was going on in 1878, and that the work of putting in any machinery could not have been begun till the winter of 1878, somewhere about October or November.

7488. Then he says, "In May 1878 they commenced work." Would it be correct to say, that you had commenced work then?—In May 1879, it is possible one of the wheels might have been in such a position as to have been turned on, but our joiners said the bars were down before any work commenced, and that the wire guard was down before the fry season came on. What I make out is that the work of putting in the turbine wheels actually commenced late in the winter of 1878, and finished up in the winter of 1879, about November or December.

7489. Then at all events in May 1879 the turbines would be running, would they?—One of them might have been ready.

7490. Then this is what he goes on to say: "When the first freshet came down, they got stepped on morning?"—Yes.

7491. That I understand him to mean is that the turbines got stepped?—Yes.

7492. "The men came to me and we got the sluices let down, and we found that they were full of the remains of fish; some of the tails and heads were to be seen." Is your evidence that that never took place?—I have made every inquiry and I find that no such thing ever took place.

7493. Then, "What kinds of fish?—(A.) Fry and salmon and some eels; the turbine could not move?"—It is a perfect myth.

7494. "In other words it was choked with dead fish?—(A.) Yes, it was choked with dead

Mr. Tomlinson—continued.

fish." Did that very often occur at your mill?—It never occurred; it would be a matter of impossibility to choke that wheel.

Chairman.

7495. That is not the question; the question is: did it or did it not occur?—As I say I have made every inquiry.

Mr. Tomlinson.

7496. I suppose there is no doubt about it that this mill Mr. Petrie is referring to, is your mill, Pollexfen's Sligo Mills?—Yes.

7497. When did you commence business there yourself?—In 1882. My father was in it before.

7498. Did you take any part in the business when your father was there?—I had at a previous time, but not in those years. I was in business on my own account 15 years at another place.

7499. Do you speak of these things from your own knowledge?—I do not. I began by saying that I did not, but that I had made every inquiry. I have the books which you may look at, and from them it appears that the building material into which the wheels were put was being supplied to us all through 1878. The last cement was got in August 1878. We have the invoice.

7500. When you say the turbine wheels were never stopped by an accumulation of salmon fry or any other kind of fish, you are not speaking of your own knowledge, are you?—No, I am not speaking from my own knowledge, but from every inquiry I have made from every one in the mill, my father and every one connected with it, the late manager of the business, and so on.

Mr. Seton-Karr.

7501. Were you at the Sligo mills in any part of May 1878?—I was not.

7502. Or any part of May 1879?—I was not, personally.

7503. Or June?—I was not. I was in a place called Ballynar, but the millwright is here.

7504. Will you kindly look at this very rough diagram? That is supposed to represent the river; this the bridge; this the weir; and this your mill. Is that, roughly speaking, correct?—Nearly correct; but this is incorrect, as it shows a small point; the river would go right over to the bank where the houses are built. There is no building representing a mill-race like that.

7505. Do you mean to say this building is not quite so large in proportion to the river as it is represented here?—It is represented here as if it were a mill-race, but the full width of the river exists there.

7506. Is there a weir there?—Yes.

7507. What goes down here?—That goes into the salt-water river.

7508. Is that another part of the same river?—Yes; it is across that that the fry go.

7509. How far is it from that bridge to your mill?—It would be about 30 or 40 yards.

7510. Is not that distance practically a mill race?—We do not call it a mill race.

7511. It might be called a mill race by other people. I suppose, might it not, although you do not call it a mill race. That is a matter of opinion, is it not?—A miller calls a place a mill race

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Sir G. T. POLEKXEN.

[Continued.]

Mr. Seton-Karr—continued.

race where there is a separate wall built in the river to narrow the course of the stream into a particular wheel.

7512. There is a separation between this part of the river and that part, is there not?—Yes.

7513. And there is one-half of the river down here, and another flow of what you call the river into your mill, is there not?—There is nothing narrowing the water to the face of the mill.

7514. But there is a separation between that part of the river and this part, is there not?—There is.

7515. And that separation also begins a little before the bridge, does it not?—This is the fresh-water part of the river, and this is the salt water, which is much lower. This is what we call the weir. If anyone wishes to call a part of the river a mill race I have no objection. I do not think there is anything in that at all.

Mr. Macartney.

7516. You do not call it a mill race, do you, but Mr. Petrie does, and you are a miller, and he is not?—Quite so.

Mr. Seton-Karr.

7517. Is this diagram roughly correct?—It is roughly correct. It is incorrect in what I point out.

7518. You only complain of it that it does not show the river to be as broad here as it really is in fact?—Yes. If I were asked to look at that, and asked if it represented our mills, I should say there is no wall or obstruction here.

7519. There is a bank here?—No, it is here, where the houses are built.

7520. As to the destruction of the fry against the gratings. I understand that you do not deny that the fry were killed against the gratings, as they were originally erected?—I do not.

7521. Do you not think it is quite possible that when the sluices were raised, as Mr. Petrie says in 1878, and you say in 1878, the fish that were killed against the gratings might have been washed down into the turbine?—I do not understand the question.

7522. What Mr. Petrie says is: "When they raised the sluices at his request, the turbine was afterwards examined, and was found to be full of dead and dying fry"?—Yes.

7523. Is it not possible that the fry were killed against the lattice; lattices were put up behind the sluices at first, were they not?—I think so.

7524. And Mr. Petrie says, and you do not deny it, that the fry were killed against those lattices?—I do not deny that.

7525. In answer to Question 3372, he says: "When the sluices were lifted up, the fish went down under the sluices, and with the force of the water they got up against this grating, and could not get away and got drowned. The gratings now are outside the sluices, outside of everything." Do I understand you to say that that answer is perfectly correct?—I do not deny it.

7526. Is it not possible that the fish that were killed against the lattices, when the sluices were lifted up, were washed down into the turbine?—If the screens were lifted up, and they were not stopped in any other way, they would wash down to the turbine. But may I say this in

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Mr. Seton-Karr—continued.

explanation: He says that there were salmon, and eels, and other fish; but they could not have been washed down in any shape or form, because the bars were there two inches apart. He says there were heads of fish, and bones, and that kind of things; but they could not have been washed down possibly, because of the iron bar guards in front of the lattices two inches apart. Fry might be washed down, but not salmon or other fish.

7527. Eels could have been washed down, could they not?—Small ones could. Anything that was less than two inches could get through, but certainly no salmon could get through.

7528. He says in answer to Question 3246: "There were a great many spent salmon; enough to fill two large wash tubs was taken out": do you deny that?—I do, and I look upon it as a perfect absurdity.

7529. Do you say that that is an invention of Mr. Petrie?—I deny it, qualifying it as I say, by saying that I was not there personally, but I made every inquiry, and everybody denies that such a thing ever happened.

7530. Do you absolutely deny that your turbines ever ran without any protection in front of them?—That is what I find.

7531. Do you also deny that your turbines commenced work in May 1878?—Yes.

7532. Mr. Petrie was wrong in a year there; they commenced in May 1879, I believe?—He was certainly wrong in saying May 1878, as far as I can find from every piece of evidence.

7533. But they were working in May 1878, were they not?—One could have been ready to work in May 1879, but not the other.

7534. There is nothing in what you have said to contradict the statement that the fry might have been killed against the gratings behind the sluices in May 1879, is there?—No; fry might have been killed against the wire gratings in 1878.

7535. You do not deny that at all, I understand?—No; I think Mr. Petrie said he attributed the great falling off in the fishing in 1878 and 1880 to the loss that occurred to fry in 1878. Of course it would make a difference, because, even if they were killed in 1878, which our men deny, it could not make a difference to the fish in 1878.

7536. I suppose Mr. Petrie may have made a mistake in the year. He may have meant 1879 for 1878 and 1880, and 1881 for 1879 and 1880. It is quite possible he may have made a mistake in a year, is it not?—It is quite possible one of the wheels may have been ready to work in May 1879, but not in May 1878.

7537. Therefore, if the fish were killed in May 1878, that would have injured the fish in May 1880, would it not?—If fry were killed in 1878 of course they would not be there in May 1880.

7538. Then in 1880, if I understand you rightly, those lattices were put in front of the sluice?—In 1878.

7539. Was there a change made in the position of the lattice?—Yes.

7540. When was that change made?—I do not know when that change was made.

7541. For all you know to the contrary it was

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[Continued.]

Mr. Seton Karr—continued.

not made till 1880, was it?—I could not say when the change was made.

7542. All you know is, that there was a change made?—All I know is that the first wire lattice, from the inquiries I have made and the books, would have been put down in 1879, but when the change was made that Mr. Petrie refers to I cannot say. The millwright may know.

7543. Do you know Mr. Robinson?—I do.

7544. Do you know that Mr. Petrie stated that he showed Mr. Robinson the turbine full of dead fry?—I do not know that he stated that.

7545. Did you ever ask Mr. Robinson about it?—I never did ask him such a thing.

7546. Who is Mr. Robinson?—He is the agent for the landlord from whom Mr. Petrie holds the fishery.

7547. Do you know Mr. Petrie well?—I do very well.

7548. Do you often meet him?—Yes, frequently.

7549. Have you ever had any conversation with him about the alleged killing of fry against the lattices in front of your turbine?—No, I have not. I had a conversation with him the day after he had arrived home from here, and told him that the evidence he gave would cause some of us to have to go over and contradict it.

7550. Did you tell him that?—I did, and he told me the inquiry was over.

7551. Do you say he only employed 20 men on his fishery?—On the Sligo fishery.

7552. Do you know anything about his other fisheries?—I do. There are three small fisheries that he has, that I know of, where I think he would employ perhaps from 24 to 30 men; but I would qualify my reply by saying that I do not know what other men Mr. Petrie may have in his employ; I speak merely of the fishery that comes under my own observation.

7553. He says in answer to Question 3328, "There are 200 men who are employed in the river constantly, and 300 are occasionally employed, who farm bits of land at other times"; do you deny that statement?—I never saw any such number of men working there.

7554. Supposing that number includes the men who are employed on the coast, do you think it is a wrong estimate or a right estimate?—If it included men fishing on the sea it might be a large number. Small hoate fish on the sea, but not for Mr. Petrie.

7555. Supposing it included the men on the coast, it might be a correct statement, might it not?—If it included every man fishing on the sea on his own account it might be correct.

7556. They get their living by it, do they not?—Yes; I understood I was asked the question as to Mr. Petrie's own men.

7557. I asked you, including the men who gained their livelihood by catching salmon on the coast, might not these figures be perfectly correct, for all you know to the contrary?—I say if the thing was to include men fishing on the sea, it would be very much under the estimate; there would be some thousands I should say.

7558. I am only talking of this particular district which is fed by the Sligo river; you do not deny that on that assumption, do you?—Not at all.

Mr. Seton Karr—continued.

7559. Do you say that the working of your turbine has been affected by this grating?—Yes.

7560. Is this an exact model of the lattice (pointing to the model)?—It is actually a piece of the wire of which it is made.

7561. Do you say it is very hard to clean?—Very hard.

7562. If you had a grating of that kind which is in use at Cork instead of this lattice, do you think it would affect the working of your turbine at all; have you looked at it?—No, I have not.

7563. Will you look at it?—This is about half-an-inch I should think.

7564. Do you think if a grating of that kind were put up instead of this lattice it would interfere with the working of your turbine?—It would.

7565. Have you ever seen one of these tried?—No, the only thing of the kind I have ever seen is the two-inch rail of our own.

7566. You do not object to those bars in front, do you, if the lattices were taken away?—No.

7567. They are no protection to fry, are they?—No, the fry could go through.

7568. Your chief objection to this is that it is so hard to clean, is it not?—It stops the work so much, and interferes with the power of the mill, it affects the cut of the meal and the out turn.

7569. But if it is perfectly clean does it then stop the working of your turbine?—Certainly it does. When the water is slow and sluggish that wire lattice lowers the head of the water.

7570. But I understand your chief objection to it is that it is so hard to clean?—That is one of the principal objections.

Chairman.

7571. Are you sure that it is not the fact of the water being slow and sluggish which stops the working of your mill instead of this netting?—It stops it more when the water is low, because if there is a big head of water going down the river, then, notwithstanding the stoppage by the screens, we have a sufficient head of water to work the turbine; but when the water is low we have to take off a pair of stones, and another, and another, until we are reduced to two pair.

7572. Did you ever take up all those lattices to see the result?—Yes, the miller has tried it.

7573. What was the result?—One pair of stones in four.

7574. He could put another pair on, you say?—Yes.

Mr. Seton Karr.

7575. That was only in May and June when the water was low?—Yes.

7576. But you only have those down in May and June?—Yes, but that happens to be the particular time when we want the water, and we cannot get it very often.

7577. You say they trouble you very much to keep clean?—Yes.

7578. You only have them down in May and June, have you not?—Yes.

7579. What is it that makes them dirty in May and June?—There is always floating debris and weeds coming down.

7580. At that time of year?—Yes.

7581. What kind of weeds and debris?—In June

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[Continued.]

Mr. Seton-Karr—continued.

Jones, I think, there is a thing called Canadian grass, and there is something else also, strong weeds, and so on. I see them constantly on it now cleaning; before I came away they were cleaning those things frequently through the day; that interferes with the power too, because they have to put down an extra lattice to take the other up, and when that is down it interferes with the even cut. You cannot keep the machinery going at the same cut.

7582. Are you working your mill now?—Yes.

7583. Have you got these lattices down?—Yes.

7584. Have you worked your mill continuously ever since the turbines were put down?—We have.

7585. Have you ever had them stopped by the lattices?—They have never been absolutely stopped, but some of the work has been stopped frequently by them, to the extent of some pairs of stones.

7586. Last year you ground 90,000 L. worth of meal, did you not?—We did.

7587. And you made a considerable profit on it, I suppose?—That includes the two mills, Sligo and Bellefleur; it was not in the one mill.

7588. What value of meal did you grind in this mill where these lattices are?—Perhaps nearly half of it.

7589. £. 45,000 worth?—I could not be exactly sure of the proportion, but I should say it would be nearly half.

7590. You did not lose money on it, I suppose?—On the year's trading?

7591. Yes. You made a profit, I suppose, did you not?—We did.

7592. Do you think the fact of the lattices being down made much difference in your profit?—I do.

7593. I directed your attention to that Cork grating; supposing you had that grating down instead of this lattice you complain of, do not you think it would improve your flow of water very much?—I think it would better than a lattice, but I should object to it very strongly.

7594. Do you know anything about its having been tried anywhere?—No; but I know pretty well through looking at it that it would be an obstruction.

7595. Do you not like the look of it?—I do not.

7596. It would be easily cleared away, would it not?—I doubt if it would; it would catch everything; men could clean that with a kind of a rake to a large extent, and in that way it would be easier. The screens, of course, have to be taken up absolutely.

7597. It would not be necessary to take this grating up, would it?—I have had no experience of this, but they may possibly be able to clean it with a rake, but not perfectly.

7598. Do you know anything about lattices and screens?—I do.

7599. Are you aware that this lattice is a very bad kind, and an old kind of lattice?—It was the kind that the fishery people insisted on our putting there, to our inconvenience.

Q.80.

Mr. Seton-Karr—continued.

7600. Did Sir Thomas Brady ever write to you in reference to your turbine?—I am not aware of it.

7601. And in reference to the protection of fry at your turbine?—I am not aware of it. If he says so I take it for granted that he did.

7602. Would he write to you or to your manager?—He would write to the firm: Middleton and F. Pollexfen, as it was then.

7603. Might he have written without your knowing anything about it?—He might.

7604. Do you say you do most of your grinding at this time of year: May and June?—Not most of it in May and June, but it is the busiest time of the season. We could not do most of the grinding in two months.

7605. I mean, is it the busiest time?—Yes; May, June, and July. The season terminates shortly after. The water is of little or no use to us afterwards.

7606. You do not keep your lattices down in July, do you?—Last year it went well into July. I may tell you we have done everything at all times to suit Mr. Petrie and give him every convenience we can, and we have been very good friends. I have nothing to say against him in the matter at all. We should be most anxious to assist in any way we could for the preservation of the fish.

Chairman.

7607. Is this correct; he says: "I meet the miller every day and he never complains of one single thing"?—He means the working miller; he does not mean any of the firm. The miller has general directions from us to give every facility in his power to Mr. Petrie without absolutely interfering with the work. In fact we have stopped the turbines frequently; we have stopped them since he was here for his convenience; he wanted to get fish down out of the tail-race.

Mr. Seton-Karr.

7608. Sir Thomas Brady, we are told by Mr. Petrie in answer to Question 3258, came down the next morning and stopped the turbine. He is alluding, I think, to May 1878; do you know anything about that?—I do not, but I say I cannot find anything that would lead me to think that such a thing could have occurred in 1878, because the building was only going on then, into which eventually the wheels were put.

7609. Might it have occurred in May 1879?—It might possibly have occurred in May 1879.

7610. For all you know to the contrary?—Yes.

7611. Do you say it could not have possibly occurred in 1878?—I cannot find that it could. When you ask me those questions I am not in a position personally dogmatically to deny the thing; but from any evidence I can get from asking the men who were there (and there are a number who were there at the time) they all so quite agree in the one thing, namely, that it could not have occurred in 1878.

7612. Do you mean for the reason that your mills were not completed?—And that such a thing

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[Continued.]

Mr. Seton-Karr—continued.

thing never occurred as that the wheel was stopped by fish.

7613. It did not occur in May 1878, if I understand you rightly, for the reason that your mills were not completed then?—Yes.

7614. But it might have occurred in May 1879 for all you know to the contrary?—Yes, that is, that Sir Thomas Brady might have been there. When you say it might have occurred in 1879 I do not mean the part about the killing of the fish, but that Sir Thomas Brady might have been there.

7615. We have disposed of the question of killing fish; you have already said they might have been killed against the lattices in May 1879?—I said that the fry might have been killed against the lattices.

7616. Do you know whether Mr. Petrie's description as to the rate of water in your mill-race is correct?—I did not hear that; I only saw a newspaper report.

7617. In answer to Question 3274, Mr. Petrie says: "The water comes down very quietly," and he goes on to say, "There is a very little fall; it is an ordinary mill-race; I suppose there is not a foot fall in half-a-mile." Do you deny that statement?—No, I do not.

7618. Is it correct that the rate of water in what you call the river, and Mr. Petrie calls the mill race, is about a foot a mile?—I think it would be very inaccurate.

7619. What should you say it was?—I should say it was very much more than that; but I would not like to say.

7620. Are you not prepared to give me accurate information?—I can tell you the fall from the bed of the river into the sluices is about 20 feet: it is four inches.

Mr. Twiss.

7621. Where is that?—From the sill where those things go across outside the sluice into the wheel.

Mr. Seton-Karr.

7622. In that part of the river which Mr. Petrie described as the mill race, is it correct to say that the water comes down very quietly?—It varies very considerably; it comes down sometimes as much as a flood, and at other times very quietly.

7623. When there is not a flood is it a correct description?—Decidedly; when there is no flood on, it is quiet.

7624. I understood you to tell Mr. Macartney that Mr. Petrie's answer with regard to that was quite wrong?—I understood Mr. Macartney was asking the question: was it a mill race. We call it the river.

7625. Your material allegation is that your turbines never ran unprotected, is it not?—What I find from the inquiries I made is that the turbines never ran without the iron bar guards two inches apart.

7626. I am talking about these lattices?—The lattices were put up after the bar guards, but before the fry season commences; that is the evidence I have got, and which is mentioned in the declaration of Mr. Egan, the mill joiner; he says the bars were put up before a wheel was turned.

Mr. Seton-Karr—continued.

7627. Therefore the statement, if it was made in that way, that the turbine ran without anything in front of it, is wrong?—I should say it would be incorrect.

7628. Can you tell us exactly, from your own knowledge, how long the turbine ran without these lattices being put down in front of it?—I cannot; the mill joiner tells me that they were put down before the fry season opened.

7629. The first year your turbine ran?—That is what he says.

7630. But you do not deny that they were put down behind the sluice at first, and subsequently, at a date of which you do not give us information, they were changed?—I believe they were put behind the sluice first, and afterwards changed to their present position.

7631. Have you read Mr. Petrie's evidence, as a whole, carefully?—No, I have not; I have read portions of it.

7632. Is not that state of things perfectly consistent with the whole story he has told us?—I took the pith of the whole story to be that the turbines were stopped and clogged with a quantity of fish going into them; and I find that is incorrect.

7633. You are informed that that is incorrect?—I am by all the people who are on the spot at the mill; they say such a thing never took place, and there was never any quantity of dead fish seen or found to be taken up.

7634. You do not deny, do you, that it is quite possible that the fish that were killed against the lattices might have been washed down into your turbine afterwards when the lattice and sluice were raised?—None of our people ever saw them in the turbine.

7635. Are you prepared to deny that evidence?—I am not prepared to deny it; but if fry were killed, as he states, in front of the lattices, they might be washed down through the turbine, because that is a self-evident fact.

7636. Do you know anything about fish and the habits of fish?—Not a great deal; but I have fished a good deal myself.

7637. Have you fished for salmon?—Yes.

7638. Have you fished for trout too?—Yes.

7639. But you do not pretend to have any special knowledge of the habits of smolts?—I do not.

7640. Do you think that smolts could go through that turbine of yours without injury?—I do.

7641. Have you any reason for making that statement?—No, it is my opinion; I have tried no experiment. I was anxious to try some experiments, in order to be able to tell the Committee; but for the last three weeks, since I decided to come over, there has been torrents of rain, and the water has been so much discoloured that we would not attempt to get smolts.

7642. Do you mean you could not catch smolts for the purpose of making the experiment?—No.

7643. Did you want to make an experiment?—Yes, I was anxious to do so, if I could.

7644. At all events, you know nothing, of your personal knowledge, whether the turbine inflicts injury or not?—I do not, beyond the fact that none of our people have ever seen or known

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[Continued.]

Mr. Seton-Karr—continued.

of any fish being killed. I see, of course, that there is not much in that, because we have had those screens down all the time.

Mr. JAMES WOTHERSPOON, is called in; and Examined.

Mr. Macartney.

7646. You are employed at Mr. Pollexfen's Mills, I believe?—Yes.

7647. Are you the millwright there?—Yes.

7648. Did you put up both the turbine wheels?

—Yes, I was one of the men who were working at it.

7649. Under whose directions?—Mr. William Middleton's.

7650. Was he one of the partners in the firm?—Yes.

7651. When were those wheels first started?—I could not exactly say the date, but it must have been some time in 1878 or 1879.

7652. When were they started; how were they protected?—Those iron bars were in front of the sluices before ever the wheel started. Those racks were not in at the time they were started; but at the time they started no salmon fry were coming down.

Mr. Seton-Karr.

7653. What year are you speaking of?—1879.

7654. Were those wires in before the fry came down?—Yes.

7655. The water comes first upon those two bars, does it not?—Yes.

7656. And then flows through the bars and goes on the lattice?—Yes.

7657. Where are the sluices?—About 12 inches off.

Chairman.

7658. Where is the turbine?—It is 19 feet from the back of the sluice to the centre of the turbine.

Mr. Macartney.

7659. So that the sluices are between that lattice work and the turbine?—Yes.

7660. Was there any alteration made in the lattice, do you remember?—I remember some objection to the first that were put in as being too large.

7661. Was that in the first fry season?—I believe it was; I could not say; but it was altered.

7662. What have you in your hand?—That is a bit of the first wire that was objected to (producing the same).

7663. What is the size of this?—Half-an-inch.

7664. Was an objection made to that, and then were the present lattices put in?—Yes.

7665. Do you remember when the first wheels were started distinctly. I do not mean the date, but do you remember when they first began working?—Yes, I was.

7666. Is it true that they were ever choked up with salmon and salmon fry or eels?—Is is not true.

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Mr. Seton-Karr—continued.

7645. As a matter of fact, according to your evidence, the fry have never had a chance of going into your turbine, have they?—Exactly.

Mr. Macartney—continued.

7667. Do you ever recollect Mr. Petrie coming down, and the wheels being examined and being found full of fry, eels and salmon?—I do not.

7668. Were you assisted by any Americans in putting up these wheels?—No.

7669. Do you believe that the turbine would kill fry if they were going through?—I do not believe it.

Mr. Tomlinson.

7670. You say that you do not believe fry would be killed by going through the turbine?—Yes.

7671. Have you ever seen any going through the turbine?—No.

7672. On what do you ground your belief?—By the report that was made that they have been killed; but I should have seen them.

7673. Whose report was that?—I have seen it in the papers.

7674. Was it reported in the papers that fry had been killed in your turbine?—Yes.

7675. When did that report arise?—Mr. Petrie gave it in evidence here.

7676. In 1879, or from that to the present time, have you any experience on which to found your belief, that salmon fry could go through your turbine without being killed?—Yes, from the size of the turbine.

7677. Is it only your inference from the size of the spaces in the turbine?—Yes.

7678. Have you any experience one way or the other as to the fact?—No.

7679. Were you at these works from the time the turbines were first started?—Yes.

7680. What position do you hold in reference to the machinery?—I am the millwright.

7681. What are your duties as millwright?—Laying the shaft and erecting the place for those turbine wheels.

7682. Had you control of the turbine wheel?—No, I had not; there were six or seven of us working at it.

7683. Then it was not your duty to observe them at all?—It was part of my duty to work at them.

7684. If the turbine wheels had been stopped because they were full of fish, should you have heard of it?—Yes.

7685. Do you distinctly say that you never heard of such a thing happening?—I never heard of such a thing happening.

Mr. Seton-Karr.

7686. What was the exact date when the turbines commenced to work?—I could not say the exact date they commenced to work, but it must have been some time in 1878 or 1879.

7687. Cannot you tell us the month?—I could not exactly tell you the month.

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7688. Was

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Mr. WOTHERSPOON.

[Continued.]

Mr. Seton-Karr—continued.

7688. Was it in March or April?—It was in the winter time any way.

7689. Then was it before March?—I could not exactly say.

7690. Mr. Petrie says they began to work in May 1878?—They did not.

7691. When did they begin to work?—It must have been in 1879.

7692. You come here to contradict Mr. Petrie's evidence, and I think you ought to tell us within a month or two when those wheels began to work; I want you to try and recollect—I could not say.

7693. Then why do you say they did not begin in May 1878?—Because we were working at them.

7694. Surely you must have some recollection of when you completed working at them?—It was about November.

7695. Did they begin in November 1878?—No, November 1879.

7696. It cannot have been November 1879; you said the winter; was it the winter of 1878 or of 1879?—It must have been 1879.

7697. The end of 1879?—Yes.

7698. Are you sure of that; I only want to have some rough idea; you need not pledge yourself to the exact month, but can you give us some idea of when these wheels began to work; do you remember when they began; were you there all the time?—Yes.

7699. Are you prepared to tell us that the turbines were not working in the spring of 1879; Mr. Pollexfen has told us that they were?—I do not remember.

7700. Whatever the date was, which you do not recollect, that grating I understand was put down the very first day they commenced to work?—Yes, this front grating.

7701. Were they ever worked without that grating?—No, they were never worked without that grating.

7702. When were the lattices behind the grating put in?—They were put in for the next season when the fry came down.

7703. The first season the fry came down?—Yes.

7704. What month would that be?—That would be about March.

7705. They were kept in till what month?—They must have been kept in three months.

7706. Was it March, April, and May, or April, May, and June?—I think at that time it was April, May, and June.

7707. Was it 1878 or 1879?—I believe it was 1879.

7708. Are you certain?—Yes, I am certain it was 1879.

7709. Then the mills must have been working in April, May, and June, 1879, and your turbines must have been run in April, May, and June, 1879, must they not?—Yes.

7710. Yes or no, is that correct?—I believe it is.

7711. When those lattices were first put down will you describe exactly in what position they were put. Were they put in front of or behind the sluice?—They were put behind the sluice.

7712-3. How long were they kept behind the sluice?—I could not say; I was not in Sligo at

Mr. Seton-Karr—continued.

the time they were altered. It was the joint who altered them.

7714. Were you not at the mill at the time they were altered?—No, I was not; I had nothing to do with altering them.

7715. Were you not at the mill?—No; I was at Ballisodare Mill. There were seven or eight of us there.

7716. Then you were not the whole time at Sligo Mill?—No.

7717. How long were you at the Sligo Mill?—I was there for three months.

7718. What three months?—September, October, and November, 1878.

7719. After that where did you go?—To Ballisodare.

7720. Then you were not at the mill when it began to work, were you?—Other men might have been working there, and I not there.

7721. Were you at the mill when it began to work, or not?—Yes.

7722. Which mill?—Sligo New Mill.

7723. But you said just now that you were at Ballisodare Mill; which is right?—I was there for these three months.

7724. I must have this plain. You say you were at Sligo Mills in September, October, and November, 1878; is that right?—Yes.

7725. After that, where did you go?—The winter and frost prevented us from working any further afterwards.

7726. Where did you go, I asked you?—To Ballisodare Mills.

7727. How long did you stay at Ballisodare Mills?—I could not say now.

7728. Have you been back since that time to Sligo Mill?—Yes, at different times.

7729. When did you go back there; after you left in November 1878?—I could not tell you.

Mr. Macartney.

7730. Do you move constantly backwards and forwards between the two mills?—Yes.

7731. Are you head millwright in charge of both mills?—I was not at that time.

7732. Are you in the habit of moving backwards and forwards constantly?—Yes.

7733. Were you then moving constantly backwards and forwards?—Yes.

Mr. Seton-Karr.

7734. Were you at Sligo Mill in April, May, and June of 1879?—I could not say.

7735. You must try and recollect; it is very essential to your evidence that you should recollect where you were at those particular times. Were you at the Sligo Mill when they first put up that grating?—Yes.

7736. Did you see it put up?—I did see it put up.

7737. I understood you to say you were not there. I asked you just now in what position they first put up those lattices. Will you tell the Committee that?—Yes, they were slanting inside the sluices.

7738. Where were the sluices?—They were here, and these lattices were put up near here; the water came through the rack first, then it came through the sluice, and then through the wire.

7739. How

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Mr. WOTHERSPOON.

[Continued.]

Mr. Seton-Karr—continued.

7739. How long were they in that position?—I could not say how long they were in that position.

7740. Were you there when they first put them into that position; did you see the lattices placed there?—No, I did not see them placed there, but I have seen them in their place.

7741. When did you see them in their place?—I could not exactly say.

7742. Was it in the spring of 1879, or was it not?—It must have been in the spring of 1879.

7743. It would have been then, would it not, during the months of April, May, and June 1879?—Yes.

7744. When were they changed?—I do not mind when they were changed.

7745. They were not changed that year, were they?—I could not say how long they remained in their first position, and when they were changed.

7746. For all you know to the contrary they might have been there during the whole of April, May, and June 1879, might they not?—Yes.

7747. Do you remember any fry being killed when they opened the sluices at any time during that fry season, up against the lattices?—No, I do not.

7748. Were you there?—No, I do not think I was there.

7749. Then they might have been killed, for all you knew?—They might.

7750. And for all you know to the contrary the turbines might have been stopped?—If the turbines had been stopped very likely some of the millwrights would have been called down to see to them.

7751. But they might have been stopped for a

Mr. Seton-Karr—continued.

day, or half a day, while they were cleaning out the fish, for all you know to the contrary, might they not?—Yes.

7752. Do you know anything about the construction or working of turbines?—Yes.

7753. You are a millwright, I understand?—Yes.

7754. Your duty is not necessarily to have anything to do with turbines, is it; as a millwright you do not look after them, do you?—If anything goes wrong with them I do.

7755. What do you do?—I repair them if anything is wrong.

7756. Do you really think fry might go through your turbines without injury?—Yes, I do.

7757. But you have no reason for saying so, have you; have you ever seen a fry go through a turbine?—No, I have not.

7758. How often have you repaired the turbines at the Sligo Mills?—At different times.

7759. How often have you done it; many times?—I have repaired them at different times since they have been put in.

7760. Has that often occurred; has it been half-a-dozen times?—About half-a-dozen times since they were put in.

7761. How long did they run after they were first erected before you first repaired them; have you any recollection of that?—I could not tell how long they ran.

7762. When did you first examine the turbine at Sligo Mill?—They were examined nearly every time that one of us were down.

7763. Cannot you remember the first occasion when you examined that turbine at Sligo Mill?—I cannot.

7764. Cannot you tell us whether it was 1879, 1880, or 1881?—No, I could not.

Sir THOMAS BRADY re-called; and further Examined.

Mr. Seton-Karr.

7765. HAVE you heard the evidence of the last two witnesses?—Yes.

7766. Mr. Petrie told the Committee, in answer to Question 3258, this: "Sir Thomas Brady came down the next morning." That next morning, referring to the rest of the evidence, must have been in May or June 1878, according to Mr. Petrie's statement. He says, "Sir Thomas Brady came down the next morning and he stopped the turbine. Then he said that they must put down bars two inches from one another, and put a lattice inside the bars." Is that correct or is it not?—It is correct; but it does not sufficiently explain to the Committee what actually did occur.

7767. Will you kindly tell us?—Certainly. I remember distinctly having heard the complaint of fry being killed, and I at once went down, and I found that the gratings were inside the sluice. First, they had an iron grating, then the sluice inside, and then the lattice-work inside the sluice. When the sluices were lifted up the force of the water drove the fry against the lattice, and they were killed. I have a distinct recollection of that, and the moment I suggested to Mr. Pollexfen's manager that the lattice

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Mr. Seton-Karr—continued.

should be changed to the outside of the sluice he did it at once. I should like to say that Mr. Pollexfen has always, and his people have always, shown the greatest cordiality and given every assistance to protect the fish in every possible way.

7768. That (pointing to the model), I understand, is the grating?—Yes.

7769. The lattices were not here on the first occasion, were they?—No; they were here near the sluice, and when you drew the sluice the force of the water drove any fry up against the lattice, and, as a matter of course, killed them. You could not expect anything else. They could not get away from the force of the water when the sluice was opened.

7770. And, I suppose, that also tended to stop up the lattice and interfere with the flow of the water?—No doubt; and this also would.

7771. Do you know how long the lattice was in that position?—I could not tell you from recollection. Had I known that this question would have arisen, I could have found my notebook of the date, which would have told you exactly what I did; and, if it is any use to you, I

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[Continued.]

Mr. Seton-Kerr—continued.

will search for my note-book, and communicate with you.

7772. Was it in 1878 or 1879?—I could not tell you.

Mr. Macartney.

7773. But, at all events, when you went there, you did find both gratings and lattices erected?—I did; it was in consequence of the report coming officially to our office that the fry were being killed that I immediately went down and found what I have described.

7774. Where did they meet the fry was killed in that report?—That I could not say from recollection, but the records of our office would completely clear up this matter altogether. As well as I can recollect, speaking now from memory altogether, the first time the turbines were put up at Sligo we had a complaint from Mr. Petrie that the turbines were killing the fish, and that there were no lattices up, and we immediately called Mr. Pollexfen's attention to the matter. I speak from recollection of the official records of our office; the applications and all letters that are received are regularly registered and every letter entered, so that it would be possible for you to get the information most accurately.

Chairman.

7775. If either side place any great weight upon this it would be better for you to let us have the records from your office?—You shall have them.

Mr. Seton-Kerr.

7776. I want to know exactly what happened with regard to the killing of the fry; it does not matter what year it was; at present you say you found the lattices behind the sluices?—Quite so; and then when the sluices were raised these lattices were not there, and the fry were struck up against this lattice-work and were killed.

7777. Did you see any dead fry there?—I saw them myself.

7778. Is this correct: Mr. Petrie says, "We got bucketsful the following morning, and Sir Thomas Brady came and stopped all that;" that is at Question 3299; did you see bucketsful of dead fry?—I did not.

7779. How many did you see?—I saw a number.

7780. Might there have been bucketsful?—That answer, to my mind, is as clear as possible. Mr. Petrie saw these bucketsful of fry killed at this place, and then he wrote to us officially, and I came down the next morning.

7781. I want it quite clear. Did you see the dead fry yourself?—Yes, when I went down.

Mr. Macartney.

7782. Did you see bucketsful?—No.

Mr. Seton-Kerr.

7783. Did you see them in considerable numbers?—No, I did not. They were evidently taken away; the mill-work would have been stopped altogether if they were there in that quantity.

7784. Then there might have been bucketsful taken away the day before, for all you know?—Yes.

Mr. Macartney.

7785. They could have taken truckfuls away the day before without your knowing anything about it, could they not?—Yes, I know nothing about it; I only speak of what I saw, and it was only just a few fry that I saw; and it was admitted the gratings were fixed in the wrong position.

Chairman.

7786. You say that at first they worked the turbine without any fry guard at all, and that then you gave instructions for the fry guard to be put up?—That is my impression.

Mr. Macartney.

7787. That is only your impression, is it?—That is all.

7788. You are not prepared to tell the Committee they absolutely did work the turbine without a fry guard, are you?—No; what I say is this: you can satisfy your own mind and the Committee by merely asking for the correspondence of that date or a letter. All our letters are registered the very day they come into the office.

Mr. Seton-Kerr.

7789. I think I will ask you, Sir Thomas Brady, to send us a copy of that correspondence?—If such a complaint were made the records of our office would show it.

7790. Did you go down that morning in consequence of a communication you received with regard to these lattices, and did you stop the turbine?—Yes.

7791. Is that perfectly correct?—That is perfectly correct.

7792. What protection did you say must be put down?—I told Mr. Pollexfen's manager, who was with me and Mr. Petrie, where the guard should be put, and not only that, but that they should be made smaller; and they were.

7793. Was it in consequence of your visit that the lattices were moved from behind the sluices to the place they now occupy?—Certainly.

7794. Do you know when that was?—No, not from recollection, but I can look at my note-books, and let you know.

7795. Have you any doubt that considerable numbers of fry were killed by being washed against that lattice?—I have no doubt about it, and I do not think Mr. Pollexfen's men had any doubt about it, and they were perfectly ready to change its position.

7796. Mr. Petrie said that the turbine was found full. He says, in answer to Question 3243, "And we found that they were full of the remains of fish; some of the tails and heads were to be seen." I suppose it is quite possible, and indeed extremely likely, that the lattices were raised, and the fish that were killed against them were washed down into the turbine?—No, I think not.

7797. What do you think?—I have no reason to doubt anything Mr. Petrie has said in the slightest, quite the contrary. I consider him a very upright man. If he saw that, it must have been before the lattices were put up at all; because the lattices when raised would not sweep these things down. If these lattices were removed

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Mr. Seton-Karr—continued.

removed to let the dead fry down, the living fry would be swept down also.

Chairman.

7798. But if they lifted the lattice after the fry had been caught they would have continued down into the turbine, would they not?—Certainly; but it would have done this, which neither Mr. Petrie nor Mr. Pollaxfen would have allowed to be done. It would have carried down the living fry as well as the dead fry.

7799. But perhaps they were all dead?—Oh no, when you talk of a body of fry you are talking of perhaps millions. They come down in such enormous shoals. I do not think Mr. Petrie would have raised these meshes to let the dead fry escape.

Mr. Macartney.

7800. The evidence is that there was no grating or lattice up of any description?—Yes.

7801. But when you went down they were there, were they not?—Yes, but one thing might have been considerably after the other.

Mr. Seton-Karr.

7802. The answer to question 3243 is: "In May 1878 they commenced work, and in June, when the first freshet came down, they got stopped one morning. The men came for me, and we got the sluices let down, and we found that they were full of the remains of fish." Is it not possible that this is what happened: that Mr. Petrie had the sluice raised and found that the space between the sluice and the lattice, or rather the space against the lattice, was full of dead fish killed in the manner you have described, and that probably the fish prevented the flow of water through the lattices, and interfered with the working of the mill?—I think not; I do not think Mr. Petrie, as a practical man, would have lifted the lattice to get rid of the fish.

7803. Is it not possible that when the sluices were lifted, and not the lattices, that they found the dead fish against the lattices?—Certainly; then that dead fish could not have got into the turbine.

7804. Then either we misunderstood him, or he is mistaken in saying the dead fish were in the turbine?—I think he is referring to two different times, and in both cases may be correct; he may be referring to a time anterior to the lattices being put down; I know distinctly I heard the complaint he refers to.

7805. At all events you corroborate Mr. Petrie in this: that a number of fish were killed by being washed against the lattices, as they were first erected, do you not?—Certainly; there is no doubt about that.

7806. Did you ever direct the exact form of lattice for Mr. Pollaxfen's mill?—No; in Ireland, as I explained to the Committee, our engineer drew out a diagram, but that was merely to help the millers to comply with the law. We never directed any particular description of lattice work; but when the lattice was considered to be too large, and that fry would be damaged, we would tell the miller it was too large, and he

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Mr. Seton-Karr—continued.

must put in a smaller one to comply with the law.

7807. Was that the first one they put in?—I cannot recollect what I saw then.

7808. Did you direct the particular kind at the time?—No, I directed the smaller one merely in this way; I told Mr. Pollaxfen's manager, as well as I told every miller, if they were complying with the law, the Act requires you to adopt efficient means to keep out fry, and that is not doing it.

7809. In your opinion are these good or bad kinds of lattices?—I think they are injurious to the mills, and I do not think ought to be enforced, I think a thing like this grating in use at Cork would not be injurious.

7810. Supposing a grating of that kind were put up instead of this lattice, do you think that would have the same interference with the effective working of their mills?—Certainly not.

7811. It would make all the difference, would it not?—It would make all the difference in the world. I object to that kind of lattice work, and I am sure the millers are perfectly right in objecting to it. This grating would be ample protection and easily cleaned, and I do not think the millers, as a rule, would object to it.

7812. Have you observed any vibration in gratings?—I have not. But talking of vibration, Mr. Macartney asked me if I had ever observed fry going in between the bars before a turbine, and I said, no, but that I had observed fry going into the bars of an ordinary head-race. Now the question of Sligo crops up, I remember that I did find them between these bars and the lattice work, and found them dead.

7813. What do you argue from that?—That the vibration here, if any, did not prevent the fry going between these bars. Mr. Webb called my attention the other day to his mill and requested me to examine the vibration particularly. I did, and watched; but I could see nothing, or, at any rate, it was not observable. Then he requested me to put my hand on it, which I did, and I could just feel something of a trifling character; so little that I could hardly call it vibration.

Mr. Macartney.

7814. Do you say you have a delicate sense of vibration?—I am really only stating what is the fact. I have the fact that the fry did go through these bars whether there was vibration or not, and that they were killed on the other side.

Mr. Seton-Karr.

7815. Do you think the vibration of these bars would never keep fry from passing through them?—Never.

7816. Were you ever requested to report to the Government on Mr. Macartney's Bill?—Yes, on the first Bill Mr. Macartney brought in in 1890.

7817. On this one, I ask you?—This is the same Bill, I believe. I was in harness that year and we reported very strongly against the passage of the measure to the Government.

7818. Tell us, shortly, on what grounds you reported?—That it would be injurious to the

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Mr. Seton-Karr—continued.

fisheries of Ireland, and on the grounds which I stated in my evidence. Of course we did not go into detail in making a report to the Government, but it was founded on the facts that I stated in my evidence, that it would leave the whole fisheries subject to the milling interests. Of course we were not asked to suggest any compromise.

Mr. Tomlinson.

7819. Can you say from recollection whether besides objecting to the positions of these gratings you objected to the kind of grating?—Yes, I remember that distinctly. Do you mean as to the size?

7820. Yes?—Yes, I did.

7821. This is put forward as a sample of the kind of grating that was originally put up; would

Mr. Tomlinson—continued.

that, in your judgment, be too wide a grating and one which would not keep out fry?—I am not quite clear that it would not keep out fry. I do not think fry would go through that. Of course I cannot say whether that was the guard that was put up 14 years ago or not.

7822. Assuming the fry had come against that and been killed in great numbers, would it be possible for a sufficient portion of the fry or pieces of the fry to go through and get into the turbine and choke it?—It might be possible if they were broken up and pushed through with the great rush of water.

7823. If the fry and fish were killed against that it might be that portions of them would get through and still get into the turbine and choke it, would it not?—It might possibly be so.

Mr. ALEXANDER BASIL WILSON, recalled: and further Examined:

Mr. Macartney.

7824. HAVE you carried out certain experiments with salmon fry at Mr. Webb's mill?—Yes.

7825. Will you give a description of them?—Mr. Webb's turbine was prepared for carrying out the experiment by placing a wire netting having half an inch mesh across the tail race, immediately below the turbine wheel, so as to completely prevent anything passing larger than half an inch. It was also prepared by having a board of light colour submerged before the entrance of the head race into the grating above the turbine. A box was prepared about three feet long by two feet wide, having a false bottom which could be raised up and which was hung, and could be lowered and raised in front of the grating of the head race. Screens were put up to prevent the observers from being seen from the head race, so that the fish should not be frightened in one direction or another. The water at the time was low. The first experiment was this: 12 fry were put into the box and submerged, and let remain for some minutes to accustom them to their position. The false bottom of the box was then raised so as to drive the fry out of this box, and their motions were observed by the aid of the white plank underneath. They all turned up stream and went out in the direction of the river, against the current. They could all be watched; they went slowly out. A second lot were put in, with precisely the same result. The next experiment was by putting 14 fry into the turbine case, that is within the grating over the turbine; and at the same time watchers were placed below to notice any coming through. Eight minutes after they were put in one live fry was observed below the wheel. After watching for 20 minutes no further fry were seen. A second lot of 12 were then put in in the same manner. These fry were gradually lowered into the trough of the turbine so as not to frighten or irritate them. A quarter of hour afterwards three were seen below alive. A pipe was then prepared made of wood, 14 inches square, and sufficiently long to reach down directly to the turbine. This pipe

Mr. Macartney—continued.

was fitted with a plug which could be forced down. In the pipe were placed 14 fry at 38 minutes passed one o'clock, and they were forced down right into the turbine, immediately after eight live fish were observed below. At 1.42, 16 additional fry were forced down, and a number were then seen below.

Mr. Seton-Karr.

7826. How many?—We could not well count. They were dodging about. There were then six dead fish, having their tails marked, put into the turbine trough at five minutes past two. These were all got at eight minutes past two below the turbine, caught in the net. The turbine was then shut down, and eight fish were found alive in the shallow water round the edge of it. Under the turbine we observed a large number of live fish, and some dead. Some 30 of them were taken out with a landing net, all in good condition. One fry after passing through the turbine under my own personal observation rose to a fly and took it. That was after coming through the turbine. That concluded the experiment.

Mr. Macartney.

7827. Who were present when those experiments were carried out?—There were some eight or ten gentlemen, some members of the press, Mr. Webb himself, his son, and Dr. Mc Donald.

7828. He is a county magistrate, is he not, resident at Randalstown?—Yes.

7829. Was Mr. Curran there, do you remember on this occasion?—I do not know.

Mr. Seton-Karr.

7830. Were there any conservators of that district there?—Not that I know of; I do not know them. There were eight or 10 or 12 people there.

7831. Was Mr. Moles there?—Not that I know of.

7832. Was any notice given to any of the fishery owners or conservators, of the experiment?

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Mr. Seton-Karr—continued.

ment?—I believe there was, but personally I did not give it.

7833. Were any of them there?—Not to my knowledge.

7834. They had notice but did not come; was that it?—I am only saying I believe they had notice. I am not aware they did, but I think I heard it mentioned.

7835. You were there, were you not, at the time?—Yes, but I personally do not know whether they got notice.

7836. I understood you to say just now that notice had been sent?—I believe that to be the case, but I do not know it to be the case. With regard to the grating in front of the turbine, the spaces between the bars are an inch and a-half, and the bars are half-an-inch thick. The resistance offered to the water by that grating took three-fourths of an inch off the head, and made a difference in level of three-fourths of an inch. The grating below the turbine, when clear of weeds, reduced the effective head by one inch. In one hour it had reduced the effective head by $8\frac{1}{2}$ inches from accumulation of weeds.

7837. What kind of grating was that?—One like this, of half-an-inch mesh. Immediately below the turbine, after passing through it, the effect of the grating put up was to reduce the available head of water by eight inches. The size of the fish passed down varied from $5\frac{1}{2}$ to $8\frac{1}{2}$ inches long. They measured from an inch and a-half to two and a-half inches over the pectoral fins. Their width was from three-fourths of an inch to seven-eighths of an inch.

7838. Why did you put that form of grating up?—To be perfectly certain of getting any form of fish that might be there alive and dead.

7839. It was simply temporary, was it not?—Yes.

Mr. Tomlinson.

7840. Do you consider that you substantially accounted for all the fish that were experimented upon?—We got all the fish that were dead without question. We may not have got all the fish that were alive, because it is possible, and probable, in fact, that those that were put into the turbine loose, so to speak, made their way back to the head race through the spar grating. No fish were injured of any kind.

7841. Do you think the grating you put up would have caught any dead fish?—We know it would have caught them, and it did, as a matter of fact catch the fish that were killed and marked to prevent the possibility of a live fish having got amongst their number. I measured the space between the buckets and plates of the turbine after it was run dry, and found it to be two and a-half inches.

Mr. Seton-Karr.

7842. Is that the amount of clearance?—That is the amount of clearance. The turbine was running at its usual speed of 18 feet per second, and is an average size of turbine on the River Maine. That is to say, these are both larger and smaller. The water would pass through that at something like 54 feet per second.

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Mr. Tomlinson.

7843. It is a low head of water, is it not?—It is 9 feet, which is a medium head of water.

7844. What is your occupation?—I am a consulting engineer.

7845. Are you well acquainted with turbines of various descriptions?—Very well.

Mr. Seton-Karr.

7846. Where did you get your fry from?—They were caught immediately above the mill.

7847. Are you well acquainted with the habits of fry?—Thoroughly well.

7848. Do you know the difference between fry and smolts?—Yes.

7849. Were these fry or smolts?—They had their silver coats on.

7850. You called them fry in your evidence?—Well, there is a confusion between the two words.

7851. You said that the first lot of fry you let out of this box turned round and swam up stream, did you not?—Yes.

7852. What do you argue from that?—That they will not face the grating.

7853. They could not get down into the turbine if they wanted to, could they?—Yes, certainly; the grating is an inch and a-half wide.

7854. You say they would not face the grating, do you not, and that they went back from it?—Yes, the box was cautiously lowered in front of the grating and allowed to rest there, and they did not rise rapidly; they came out one at a time and went up stream.

7855. Could the fish see you?—No.

7856. Are you sure that those were fry or smolts with their silver coats on?—Quite sure, every one of them.

7857. What were their lengths do you say?—Between $8\frac{1}{2}$ inches and $5\frac{1}{2}$ inches.

7858. Did they all swim up the mill race?—Yes.

7859. Do you know what became of them?—No.

7860. Can you swear they did not go through the grating?—I can.

7861. Were any fry killed at all in your experiments by the turbine?—None by the turbine.

7862. You are quite certain about that?—Absolutely certain.

7863. Was the turbine working at its ordinary rate of speed?—Yes, at its ordinary rate of speed, doing its ordinary work with 76 revolutions per minute.

7864. What was the velocity of the outside circumference?—Eighteen feet per second.

7865. The clearance, I think you said was $2\frac{1}{2}$ inches?—Yes.

7866. That is rather a large clearance, is it not?—No, it is about the usual. It is not at its maximum clearance. Its maximum clearance would be approximately $3\frac{1}{2}$ inches.

7867. How do you vary the clearance?—It is varied by means of regulating the turbine.

7868. It is rather a large clearance compared with other turbines, is it not?—No, the clearance varies with the size of the turbine. Of course in a very small turbine (some are made $5\frac{1}{2}$ inches diameter),

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Mr. WILSON.

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Mr. Selous-Kerr—continued.

diameter) the clearance would not be more than a quarter of an inch.

7868. We have had evidence of expert witnesses that many turbines have only a quarter of an inch to half-an-inch clearance?—It entirely depends on the size of the turbine.

7870. Two-inches-and-a-half is rather a large clearance, is it not?—No, not for that size of turbine.

7871. There are a great many turbines, are there not, of smaller diameter which have a very much smaller clearance?—Yes.

7872. Down to a quarter of an inch?—Down to a quarter of an inch.

7873. Do you think these fry would go through a turbine with a $\frac{1}{2}$ -inch clearance?—Certainly not.

7874. Do you think that would kill them?—Certainly.

7875. Do you think that this turbine having a clearance of $\frac{1}{4}$ inches accounts for the fact that none of them were killed?—Had it been smaller they would have been killed.

7876. Does the fact that the clearance was $\frac{1}{4}$ inches account for the fact that they were not killed, in your opinion?—Yes.

7877. Does the turbine ever work faster or slower than it was working on that occasion?—Within one or two revolutions it was doing its normal work at its normal rate of speed.

7879. Did I understand you to say that in your opinion had satisfactorily accounted for all the fry you put in?—Yes.

7879. And that absolutely not one of them was injured?—Absolutely none were injured.

7880. Is it possible that some of them got a slight injury which would ultimately kill them, without your knowing it?—That I cannot say.

7881. It is possible they might for all you know to the contrary, is it not?—It is possible.

7882. Do you think your experiment was quite satisfactory?—Yes.

7883. What does it prove in your opinion?—It proves that smolts can go safely down through a turbine within certain limit of size, and that where the turbine becomes too small then they will be cut; if it is large enough to pass them they will not be cut.

7884. Do you think it is not necessary to protect a turbine like this one?—I do.

7885. Except by the ordinary grating which keeps out trees and dead cove and that sort of thing out?—Quite so.

7886. Supposing a shoal of a thousand or several thousands of fry were coming down on their way to the sea, could all pass through this turbine without injury?—I think so.

7887. Are you confident of that?—I see no reason to doubt it.

7888. How is this turbine guarded?—It has got spars in front similar to those, with an inch and a half spaces.

7889. Anything else?—No, nothing else.

7890. Mr. Webb is not complying with the law, I believe?—No.

7891. We have had this Cork grating produced since you gave evidence I believe?—Yes.

7892. Do you think that would interfere with the effective working of that turbine?—It would require to be cleaned out at more frequent intervals than the present grating.

Mr. Selous-Kerr—continued.

7893. It could be easily cleaned, could it not?—Yes, it could; it is infinitely better than the submarine trough or grating of that description.

7894. We are agreed, are we not, that that is a bad kind of lattice?—I consider that anything that has got a hole in it as distinct from a slit is a bad grating, whether a submarine trough or otherwise.

7895. You are not prepared to tell the Committee, are you, that that grating would interfere with the working of Webb's turbine?—It would interfere with it more or less.

7896. Would it interfere with it materially?—In some conditions it would interfere with it materially, where there was a large quantity of leaves and small matter coming down.

7897. But that matter does not come down when the fry are running, does it?—I gave you in my evidence that as much came down in two hours as blocked up this other grating to the extent of eight inches.

7898. What kind of material was that?—It was principally apparently green American weed.

7899. How came it to be coming down at that time?—I cannot tell you. It was very low water; there had been no floods or anything of that kind, and nearly the whole of the water was passing through the turbine, and very little over the weir.

7900. That was rather phenomenal, was it not?—I am not aware that it is so.

7901. It does not come down usually at that time of the year, does it?—It does come down.

7902. April, May, and June are the three months when, as a rule, the river is the clearest from weeds, are they not?—No; I have seen a great deal of weed coming down in all those months, and very often when a flood comes down it sweeps down a great quantity of the dead leaves of weeds and water-growing plants. These, however, were not dead; they were green.

7903. They must have been disturbed by something, I suppose?—I do not know anything about that.

7904. They do not usually come down in that way, do they?—I fancy they break off. I think the mode of propagation of the weed is that it detaches itself and goes to a new place and roots itself.

7905. Do you think that grating can be easily kept clean?—Yes.

7906. And if it is properly cleaned, would it materially interfere with Mr. Webb's turbine?—No, it would not, materially.

7907. With regard to the fry which you got below the turbine alive, are you sure that there were no fry there before you tried your experiment, or before you put the net there?—So far as we could see, there were none. The net was down several hours before we began the experiment; and before we put any fry in we looked under the turbine to see if we could see any, and there were none.

7908. Did you make a careful examination?—Yes.

7909. Do you think it was possible there were fry there?—Possible, but highly improbable.

7910. It

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Mr. WILSON.

[Continued.]

Mr. Seton-Karr—continued.

7910. It is not easy to see fry, is it?—It is easy.

7911. There might have been some there without your having seen them, might there not?—There may have been a few.

7912. I suppose you are perfectly aware of the legal necessity to protect these turbines when they were put up, are you not?—I was not.

7913. You are Mr. Webb's consulting engineer, are you not?—I have been employed by him as consulting engineer.

7914. Did you erect these two turbines for him?—No, I made some of the machinery for one of the turbines for him.

7915. I thought you were especially in his employ as consulting engineer?—No.

7916. You are only occasionally employed by him, are you?—That is all.

7917. You did not erect both these turbines for him, then?—No.

7918. Did you erect the last one?—I did not erect either of them.

7919. Could any fry have possibly escaped, or dead fry have floated down past your net?—No fry, either dead or alive, could have escaped.

7920. How was the bottom of the net fixed?—

Mr. Seton-Karr—continued.

A piece of wood was buried in the ground underneath the water, and another piece carried across well above the water, and between these two pieces the net was strained.

7921. Was the piece of wood at the bottom placed along the bottom of the tail-race?—Entirely across the tail-race.

7922. But supposing there were uneven places in the ground?—It was buried below the lowest point to prevent the possibility of that. As a matter of fact, we had in addition to that a hand-net stretched across from side to side, but the hand-net was merely for the purpose of catching the fish as they came through. As they came through we picked them up, sometimes three or four at a time, after they had passed through the wheel. The hand-net was about five feet wide and 14 feet long.

7923. Could they have possibly got by the sides of your netting?—No, quite impossible; all the water passed through the net.

7924. Where were the fry caught?—They were caught on the spot.

7925. With regard to the notice which has been given, do you say notice was given?—I believe so; I cannot speak to that positively.

Mr. JAMES WEBB, re-called; and further Examined.

Mr. Macartney.

7926. At these experiments that Mr. Wilson has been giving us the details of you were present, I think?—Yes.

7927. Are these the experiments which you told Sir Thomas Brady you would carry out?—Those are experiments I had hoped Sir Thomas would have been there to conduct.

7928. Did you also inform Mr. Hornsby that you were going to carry them out?—I informed Mr. Hornsby on the previous Friday, and I asked him could he be present, or could any one be sent from the fishery office in Dublin to assist as a witness, and he said that he was engaged here himself, and that as Sir Thomas Brady had taken the matter in hand he did not like to interfere.

7929. Did you give written notice to one of the water bailiffs?—I wrote a letter to Sergeant Michael Brown.

7930. Who is he?—He is the superintendent of the water bailiffs in the immediate district of Randalstown, and late sergeant of police. He came down in response to my letter, and he stated that he would rather not interfere as he had no authority from his superiors. I requested him simply to stand by, and be able to give a full report of the matter; but he said he was afraid he would be summoned to the Committee, and he did not remain.

7931. Was Mr. McDonald present as the local magistrate of the county?—Mr. McDonald is one of the magistrates who convicted me on several occasions.

7932. Was Mr. Currey there?—Yes, Mr. Currey is perhaps the most experienced fisherman in the neighbourhood; he has fished for 40 years all along the river, and made arrangements in regard to taking charge of the fish.

0.60.

Mr. Macartney—continued.

7933. Was the Press fully represented?—It was not very fully represented; there were two reporters there. May I say that the week previously I, myself, in conjunction with three others put 90 smolts through the turbine. We put through in the first instance 40, and then we put 42 through. We allowed them to get quiet. When we first brought them in in the case they dashed about, but we allowed them to remain for a few minutes until they gradually got quiet and accustomed to the new situation, and then we gradually put them down in the manner described by Mr. Wilson without disturbance, and unquestionably of those 40 which we put through in the first instance we found six of them (there being no grating on at the time, but the water was perfectly clear and everything could be seen) rise and swim down under the arches in a few minutes. Then we put 52 through by means of the tube which Mr. Wilson described, and as to those 52 undoubtedly everyone of them went through the turbine, and in a moment the whole place below was alive with them.

7934. Did you pick up any injured?—Not a single one of them was injured; if one had been injured in the slightest degree it would at once have risen to the surface or gone on its side. Then we tried the same experiment that Mr. Wilson tried. We put five dead ones that had been brought over on purpose through the pipe, and in about a minute and a half the five appeared, proving that there were no other dead ones. We got the five with a landing-net; one of my men was below on a ladder and got them, just as Mr. Wilson got the marked ones out. There was not the slightest injury or abrasion on any part of the dead fish.

Q Q 2

7935. On

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Mr. WEBB.

[Continued.]

Mr. Macartney—continued.

1935. On these occasions were the smolts all put in above the grating?—No, we tried them above the grating in the manner described by Mr. Wilson. But I consider the only true test as to whether turbines are killing fish is this: we lowered them in the box; we lowered three boxes full, besides the two mentioned by Mr. Wilson, in front here, to test the theory of bar vibration and whether they would pass through. Of those boxes full which were lowered, as a matter of fact (except there was one which I was doubtful about, and which I am inclined to think went through the bars) every single fish the moment it tailed back if it touched the grating went out into the stream, proving, as I contend, that moderately close bars, of say 1½ inches with vibrating machinery behind them, are practically a complete protection from the fry passing into the turbine at all, even if the turbine did kill them. Evidence was given here in regard to a large number of dead fry being found on several occasions directly below my turbine wheel by Mr. Moles. I may say that during the 12 or 14 years that that turbine wheel has been put up, no one in the place and no angler in the place ever saw an injured fry in the race. I myself have passed it thousands of times, and since this matter arose have examined every spot mentioned by Mr. Moles where he found them; and there was not an injured fry anywhere. In one of the cases against me I asked Mr. Moles, had he ever seen or heard of a dead fry in my race, and he said that that was not a legal question, and he would not answer it. The magistrates insisted that he should, and then he said he never did. On the second prosecution, when Mr. Dodd was there, he stated that on one occasion he had found dead fry in the race, three of which he said he had taken out with a landing-net. That, he said, was on the 28th or 27th of the previous May. Then there was the case in Belfast when he enlarged on that statement and said that on both the 27th and 28th of May he had got dead fry in the race. Here he enlarged that to a very considerable extent; but I deny absolutely that there was ever a dead fry found in the race or below the turbine wheel.

1936. Did you hear Mr. Moore put in a letter with regard to some experiments which he said had been carried out by Mr. McDermitt at a mill belonging to Mr. Anderson; is Mr. Anderson a millowner?—No.

1937. Have you made some inquiries with regard to that?—Yes; I went to Newton Cunningham and I found there was no turbine wheel there, and no turbine wheel owner at that place. I went for miles round looking simply for a gentleman named Anderson; at last I found a gentleman living at a place called Inch about eight miles from Derry of that name, but he was a Presbyterian minister. He was the only gentleman I could find of the name.

1938. Had he a turbine?—Yes, he had a little turbine nine inches in diameter working a little grist mill or something of the kind at the back of his place. It was simply a toy, three inches larger than the model which Mr. Cadle produced.

1939. Had any experiments been carried out there?—Yes, he informed me, and also some

Mr. Macartney—continued.

members of his family, who were there, that Mr. McDermitt brought some fish in a can, or in two cans, and put them through this turbine. Some of the fish were living dead in the bottom of the can, and a considerable number of the others were weak and gasping at the top of the can. The dead ones were taken out, and the others were jammed into this pipe above this little bit of a turbine. The belt connecting with any machinery was taken off, and the wheel was allowed to spin wild before the fish were sent through it.

1940. So that if the turbine was of itself a destructive turbine when doing its work, its destructive tendency was increased to an enormous amount by disconnecting it?—Yes.

1941. Has Mr. Anderson embodied what he told you in writing?—Yes, I have his sworn declaration here.

1942. Will you read it?—This gentleman is prepared to come over if the Committee require to see him. He says: "I, James Anderson, Presbyterian minister of Inch, in the County of Donegal, about eight miles from the City of Londonderry, and in the Petty Sessions District of Newton Cunningham, do solemnly and sincerely declare that I erected close to my house some time ago a very small turbine wheel, said turbine wheel is not an ordinary sized turbine wheel, such as would be used on any salmon river with full flow of water, being only nine inches in diameter, and only suitable for a small stream or burn. It works a small corn or grist mill, and the water which drives it has a fall of 40 feet and comes from a dam on the side of the hill above my place. It is estimated to make 818 revolutions per minute with said fall of 40 feet. On or about the 24th of April last a man who gave his name as McDermitt, and who is connected with the salmon fishery, called upon me and said they were thinking of putting up a turbine wheel, but before doing so, they wanted to know if turbine wheels killed fish, and he asked me if I would allow him to put salmon fry through my wheel to obtain the required information. To this I assented. On Thursday, the 28th of April, he called at my house at Burt at about 12 o'clock, in company with Mr. James Brown, of the city of Derry, turbine wheel agent, from whom I bought my wheel. McDermitt had two cans of salmon fry with him, which he had brought that morning from Newtownstewart, or gave me to understand he had, a distance of 25 miles by rail and car. When the cans were opened, I observed that some of the fish were dead, others were weak and gasping, and the rest appeared healthy. The dead fish were taken out, but all the others, including the weak and gasping fish were passed into the pipe of the turbine. The belt connecting the shaft of the turbine wheel with the machinery was taken off, and the wheel was allowed to spin round without any check, having nothing but itself and upright shaft to drive. Then about 30 fish, including the weak and gasping fish, were dropped into the pipe directly above the turbine through a cap that was taken off at that point; and nearly all the fish were crushed through the tiny apertures of the wheel, only 11 coming out with life in them. I believe, and

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[Continued.]

Mr. Macartney—continued.

and did at the time, and from what McDermitt told me that Mr. Brown was brought there by him, expecting to get an order for a turbine wheel, and that he had no idea, any more than I had, that the experiment was being carried out, as I have since been told it was, to be made use of as evidence before a Select Committee of the House of Commons, of the destructive character of ordinary turbine wheels on salmon rivers. I was standing by watching the experiment during the whole time that it was being carried out. That declaration was made before Mr. P. G. Rodger, justice of the peace for the said county.

7943. In your opinion, would an experiment carried out in that manner be certain to kill a quantity of smolts?—Absolutely certain. Any such experiment should be carried out in a most careful manner.

7944. This turbine belonging to the Rev. Mr. Anderson would be perfectly useless, I suppose, for any milling industries?—Perfectly useless. It is a little nine-inch turbine wheel.

Mr. Seton-Karr.

7945. Mr. Moles was not present at your experiment, was he?—No, he was not.

7946. Why not, do you know?—I do not know.

7947. He is the fishery inspector in your district is he not?—He is the fishery inspector at Ballymena. I should say Sir Thomas Brady was in company with Mr. Moles. When he called at my place he was acting with him, and I presume should have communicated any notice to him.

7948. Mr. Moles was in the neighbourhood, was he not?—I do not know that he was.

7949. Is not he usually in the neighbourhood?—No, I think he lives at Ballymena; he is not five times at Randalstown in the year I should think.

7950. How far is it?—Ten miles by one road and nine miles by another.

7951. Was any notice sent to him of this experiment?—Certainly, I sent it to Sir Thomas Brady, and he accompanied him when he was going his rounds.

7952. Who sent the notice?—I sent the notice to Sir Thomas Brady.

7953. Did you send notice to Mr. Moles?—Certainly not.

7954. Do you not think it would have been better for you to have sent notice to your local inspector?—I will give you my direct answer if you wish it.

7955. Certainly?—He is simply a man that I could not depend on for a single moment, either his truth or anything else, from what I have seen of him. If Sir Thomas had chosen to bring him on the ground, as he did on a previous occasion, he might have done so.

7956. You are not on good terms with Mr. Moles, are you?—I do not trouble myself with the question of "terms"; but he is a man who neither I nor anyone else in the neighbourhood ever could have any confidence in. I am not more severe on him than Sir Thomas Brady himself is.

7957. On that ground you did not send him notice?—I had no intercourse at all with him.

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Mr. Seton-Karr—continued.

I did on the former occasion send him notice and asked him at an earlier stage and he declined to watch below my turbine. I told off a man always to stay with him when he was there, and I gave him permission as I told you; he was acting apparently in conjunction with Sir Thomas Brady. On the Saturday previous he arrived on a car with him, and I sent full particulars to Sir Thomas Brady pressing him to be present.

7958. Do you say even if Mr. Moles had been there you could not have put any faith in any statements he may have made afterwards about it?—Not the slightest.

7959. Do you think he would have misrepresented the experiment?—I would have preferred not answering your question, but you press me and I told you why I would have no intercourse with him; I consider that in making the statements with reference to finding fry below my turbine wheel that he perjured himself on one occasion or another.

7960. Are you prepared to tell us that his evidence is perfectly unreliable?—Is perfectly unreliable.

7961. Have you any particular reason for saying that?—I think I have given you a very substantial reason.

7962. You only say you yourself do not believe what he says?—Before I was on the Randalstown bench, when the chairman of Conservators was there himself, a rule was made on that bench, that the sworn evidence of any of the fishery bailiffs would not be taken unless it was corroborated; and that rule exists on the bench still, owing to a number of miscarriages of justice. You have pressed me on that point; remember I do not wish to say anything about Mr. Moles one way or the other, only you pressed me.

7963. I asked you why Mr. Moles did not have notice of your experiment, and you volunteered the information. We are very glad, of course, to hear what you have to say on the subject. Do you say that the Randalstown bench do not believe fishery inspectors, as a class?—I say that the Randalstown bench made a rule a good many years ago that, in regard to prosecutions by water bailiffs, the evidence of one man never would be taken unless it was corroborated, owing to a number of miscarriages of justice which had been brought to light, and that that rule has been strictly adhered to on the bench since I was on it, and long before.

7964. Are you telling the Committee that they would not take a man's evidence because he was a fishery inspector; because he was one man?—Sir Thomas Brady told me Mr. Moles was not a fishery inspector, but only a water bailiff.

7965. Answer my question: would the bench not take the evidence of one man because he was a fishery inspector or because he was only one man?—When Mr. Jones, the chairman of the Conservancy Board of the district, practically acted on the bench, and was chairman of the bench in conjunction with the stipendiary magistrate, before I was a justice of the peace myself, he made that rule, and it has been strictly adhered to, and has been found necessary. That gives you

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Mr. Seton-Karr—continued.

an idea of the type of men that those engaged in manufacturing industries have to deal with.

7966. Are you suggesting that the bench do not believe fishery inspectors as a class?—I do not know that we had any fishery inspectors there except Mr. Moles.

7967. Was it only Mr. Moles they did not believe?—No.

7968. You have not answered the question; do you mean to tell the Committee that the Randalstown bench would not believe fishery inspectors as a class?—I have told you merely the facts of the case.

7969. But you have not answered that question?—I am not going to answer for all the Randalstown bench; if you will ask me individually I will tell you.

7970. You have made a suggestion, and I must know what that suggestion means; you have said that the Randalstown bench would not take the evidence of one fishery inspector?—You will pardon me; I did not say so.

7971. What did you say?—I stated that a rule had been made on the Randalstown bench, before I was a magistrate on that bench, that the individual evidence of any water bailiff would not be taken unless it was corroborated by other evidence.

7972. I asked you: was it because he was a water bailiff that therefore they did not believe what he said, or simply because he was only one man, and they wanted his evidence corroborated by a second?—I stated, and I state again, that it was owing to a number of serious miscarriages of justice being brought to the light of the magistrates where they had convicted on the evidence of such water bailiffs.

7973. Do you mean that the water bailiffs do not tell the truth?—Decidedly.

7974. And therefore they did not believe them as a class?—And therefore they made that rule; and a very proper and necessary rule it has proved.

7975. You contradict Moles's evidence do you, and you say you do not believe it?—Most distinctly.

7976. And you ask us not to believe it?—I say there were half-a-dozen leading men, anglers and others, who were examined on their oath, who stated they had never seen such a thing as an injured fry in the race, whereas Moles swore that whenever he looked he was able to find plenty.

7977. Moles told the Committee, in answer to Question 2130, "Have you ever seen any young salmon dead?"—(A.) Yes. And in answer to the next question, "Under what circumstances?"—(A.) I got them on two occasions at Mr. Webb's works, at Randalstown, when the works were turned off. I lifted five, about five or six perches from where the turbine works; and on another occasion I brought three away, but there were considerably more there." Do you mean to tell the Committee that that is absolutely false?—I do; I have not the slightest doubt that that is an absolute fabrication, and is directly contrary to what he swore before. Either it was false then or on two occasions before he perjured himself. That he is in the dilemma he is in.

7978. Can you give us some reason for making

Mr. Seton-Karr—continued.

that very serious allegation?—I think I have given you sufficient reason. I would have preferred myself that the question of the character of water bailiffs had been left out of the question; but it was Mr. Seton-Karr who pressed the question on me, and I asked him not to put it.

7979. We have this statement in the printed evidence which is before us, which we have to consider, and I understand you to tell the Committee it is a fabrication?—I say I believe so.

7980. And I am entitled to ask you the reason why you call that a fabrication?—If you like I will repeat it, but I have stated it. I say that since that every spot has been watched. I put a platform there, and maintained it for two months during the descent of the fry, and even their local man (Brown) stood on that platform and watched to see any dead fry, and they were not able to produce a single one.

7981. Because you have not seen any dead fry, therefore you say that Mr. Moles must have been fabricating the statement when he says that he did pick them up below your turbine, do you?—I do, and I will give you another reason. Prior to that Moles had called on me and requested me to put up these erections. My reply to him was that no fish were killed of any description by my turbine. He never said they were; and this very place where he states he found these fish is within about four perches of my office, close to my office. He never produced them; he stated that it was in May 1891. From May 1891, up to the end of that year he called on me two or three times; on every occasion I stated that my turbines were not killing fish, and that such erections would destroy my works; and he never once stated to me that he had ever found those fish which he afterwards informed the Committee he had found there on the 28th May. If he had found them he certainly would have informed me; instead of that he simply carried them home in his pocket, 10 miles away, and showed them to his wife, and never showed them to anyone else.

7982. It was not his business to produce the dead fish that he found to you, was it?—I should say it was his business if he found those fish within a few yards of my office, when the matter had been called in question as to the fish being killed at all, to have told me. It would have been ample proof in his own favour if he had shown them to me.

7983. Do you say that you and Mr. Moles are not on good terms?—The fact of the matter is I never trouble myself about him.

7984. Do you not speak to him?—I am very happy to say I have not seen him for 12 months on my premises until Sir Thomas Brady brought him on a car; and the last time I saw him they were fighting. If any gentlemen of the Committee will come there I will put hundreds through the turbine with pleasure.

7985. Under those circumstances was it likely Mr. Moles would bring the dead fish that he found to you?—You are going back to an earlier stage. It was not until I found Moles stating what was absolutely false that I troubled myself about it. For that matter if he saluted me tomorrow I would salute him. But I tell you I

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Mr. Seton-Karr—continued.

do not think I have seen him for 12 months in Randalstown.

1986. You have told the Committee that Moles has been making false statements?—I say I believe so. I say the facts surrounding the case force me to that conclusion.

1987. In support of that statement you say Mr. Moles has never brought any dead fish to you, and, therefore, you do not believe he ever found any. I ask you to answer this question; was it likely that if you and Moles were on bad terms, he would bring any dead fish he found and show them to you?—I was not on bad terms with him at the date when he said he found those fish.

1988. You were not?—No. He had called on me and I had given the answer I have told you of; but I never had had a sharp word with him; in fact I have only had a sharp word with him once.

1989. He says in answer to question 2132, "I have no hesitation in saying they" (the fry that he found) "were killed by the turbine." Do you tell the Committee that is a fabrication? I do unquestionably, from my experience. I say that when we have put them through in such a cruel manner, as I have put over 200 through (I have put several through besides those which you have been told of here), they could not be killed.

1990. Was it at the upper turbine of your mill that the experiment was tried?—Yes, at the one where Moles said he had found the dead fish.

1991. Is that the upper turbine?—Yes.

1992. Is the tail race covered in below that particular turbine?—No, there is a splendid place for observing immediately below as described by Mr. Wilson. There is about 18 feet in front, and then it goes through an arch which is seven perches long. Then the place is open the whole way down for a quarter of a mile; and I pass along that every day three or four times, and have done so for 14 years, and never seen any dead fry.

1993. Then the net was placed about 18 feet below the turbine, was it not?—Yes.

1994. And you could observe all the water perfectly well?—Yes.

1995. And below that there was a covered subway, where you could not observe it, was there not?—No fish could go into that. We had an absolute netting sunk into the bed of the race, and straight across, and a much superior net to the one Sir Thomas Brady had.

1996. Do you think it is possible there could have been any fry in the water between where the net was placed and the turbine, before you tried your experiment?—No. Of course if fish had been passing through the grating there might have been. But we put at the mouth of the pit an 11 inch board, by which you could see every fish passing there backwards and forwards.

Mr. Tomlinson.

1997. Where was that; below the turbine?—Yes. We will suppose this to be the turbine pit. Underneath that there is 5 feet. The fish were passed down through that and came out below. Then there are about 6 feet in front sloping up like that, and we had this netting

0.80.

Mr. Tomlinson—continued.

18 feet right across the race from wall to wall and bedded in the sill, so that not a single fish could pass. Then we had a net in front of that to lift the fish with. Then here we sank a white board about 4 feet or 5 feet deep; and even if there had been any fish near the bottom you could have seen them passing backwards and forwards. Before we tried it, with the object of making sure, we watched the place to see if there were any fish in it, but there were no indications of any at all.

1998. If there had been any they must have come through the turbine, must they not?—Yes, there were none there at all, and immediately afterwards they were jumping at the fly as you have heard; the whole place was alive with them. I caught a lot of them and let them into the race again, and then when the net was taken off you could see them sailing in a couple of shoals down the race.

1999. Do you think your experiments clearly show that your turbine does not hurt the smolts or fry at all?—Yes, I think they fairly show that these stories that have been told in regard to my turbine, or any other, are simply fabrications from beginning to end.

2000. Do you say they are all fabrications?—I think the whole thing resolves itself more or less into a conspiracy.

2001. Do you argue that all turbines are equally as harmless as your own?—No, I gave my evidence very accurately and correctly on that point. I did not say that.

2002. Do you confine your observations to your own turbine?—No, I go a good deal further.

2003. I want to know how far you go?—I say, and my theory and what I believe from observation is, that with gratings such as mine, an inch and a half, or a little smaller or larger, salmon fry will not go through. There is a disinclination on their part to go through them, even when they are prepared to go down the race. On that point I may say that within the last two or three weeks there have been thousands and thousands of smolts seeking to go down the river in my race. I have made particular observation of them, I have remained, I suppose, an hour at a time watching them coming down to the grating naturally, and not put there artificially. I have seen hundreds come down. Sometimes there are three or four only; and on one occasion certainly over 100 came down together, and not one solitary one of those fish passed through the grating. They came down at first, apparently desiring to descend. They backed, and the moment they touched the grating with their tails they shot ahead and went up the race.

2004. Is that the same kind of grating as that of which we have a model?—It is not exactly the same; this is a two inch grating; mine is an inch and a half grating; but still it is practically the same thing.

2005. How do you account for the fact that Sir Thomas Brady has informed the Committee that at the Sligo mills fry did go through. Is he mistaken or is he in the conspiracy you speak of?—No, he is perfectly right and the explanation is exceedingly simple. These structures were put up apparently under the direction

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Mr. WEBB.

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Mr. Tomlinson—continued.

of the fishery authorities; they were put up first in one place which killed the fry. It was their netting that killed the fry; the only proof was that the nettings which we wanted to discard were killing the fry.

8006. The point is that the fry were killed behind the grating?—Yes.

8007. If they never got through the first grating they could not be killed behind?—That is so.

Mr. Selon-Karr.

8008. How do you account for the fact that Sir Thomas Brady saw, or says he saw, fry go through a grating precisely similar to your own which you say fry will not go through?—I will tell you exactly. Because the sluices are close behind this thing here. When I saw Mr. Pollenfen's sluices they were close to the grating. Mr. Petrie, or Sir Thomas Brady, according to Mr. Petrie's evidence, insisted on these nettings being put down here, and when they were there the fish were killed.

Chairman.

8009. The question which you are asked is whether those gratings are enough to turn the fry up the river?—Exactly.

8010. Sir Thomas Brady says they are not enough to turn the fish up?—Quite so.

8011. And your answer to that is that you put these fry in a box, and when you turned them out they turned tail and went off. Is not that the answer? Smolts in one set of circumstances might do one thing, but in an unnatural way, such as when confined in a box, they might do another thing?—But the description given by Mr. Petrie was when the netting was raised the fish were forced through.

Mr. Selon-Karr.

8012. Do you say the fish were washed through against their will?—Yes, in that way; if there had been a shoal there undoubtedly they would have been carried through the moment the sluice was raised.

Tuesday, 31st May 1892.

MEMBERS PRESENT:

Sir John Whittaker Ellis.
Mr. Hozier.
Mr. Macartney.

Mr. O'Neill.
Mr. Seton-Karr.
Mr. Tomlinson.

SIR JOHN WHITTAKER ELLIS, BART., IN THE CHAIR.

Mr. ALAN HOENSBY, called in; and Examined.

Chairman.

8013. WILL you please state to the Committee what you have to say?—After what Sir Thomas Brady has said I have not very much to say. As you are aware, I am one of the inspectors of Irish fisheries, and have been for some years now. I have been in charge of this northern district. I visited most of the mills, and in order to give the millers, or mill proprietors rather, every chance, I took Sir Thomas Brady with me where any doubt occurred in my own mind, so that they might have every opportunity of receiving fair play at our hands. I am now talking about the gratings, at the head and tail-races. I do not think the millowners have any cause of complaint as regards our action; they have always expressed themselves perfectly satisfied to me when I have visited their premises; we have always met on very friendly terms, and I have always explained to them that while representing the fishery interest nothing would induce me to do anything to interfere with their milling power.

8014. There are two points that we should like your opinion on; the first is, as far as your experience enable you to judge, are you of opinion that a turbine is a machine which is injurious to salmon fry, assuming them to be drawn into it?—I should say certainly some classes of turbines are. I would not like to say that all of them are, but there is no doubt some of them must be.

8015. Do you know the action of the turbine?—Yes.

8016. And that the fish has to descend and then gets whirled round and out again. Do you think that that is a process which results, in their early stage of existence, are likely to pass through without injury?—I do not. I think some may pass through, but I think when smolts come in a compact mass as they do and get into a turbine, a large portion of them would be washed up or mutilated in some shape or form.

8017. In your opinion is it desirable that there should be some form of protection to a turbine?—I think so; some form that might be agreed upon between the parties.

8018. Do you think it is difficult to contrive a fender (which is a word very often used with reference to an appliance for the prevention of

things getting into the way of machinery) of some description which might be provided, which would not be expensive and would not be injurious to the mill power?—I think it would not be difficult.

Mr. Seton-Karr.

8019. I think you say that no injury has ever been done to the effective working power of mills, so far as gratings are concerned?—I do not think so. I heard one gentleman, Mr. Gibson, complain that backwater was caused in his tail-race, but it was open to him to have applied to us for exemption, and we would have investigated the matter on the spot, and given it to him if it was proved to us.

8020. In the carrying out of the law and granting of exemptions I understand you to corroborate Sir Thomas Brady that the most favourable view is always taken to the millowner?—Yes; I have always done so, and he has too.

8021. Can you tell the Committee of a single instance, beyond what you said just now, where exemption has been refused to a millowner where he has reasons for applying for it, or where the law has operated unfairly towards him?—I do not think so. In many cases what millowners complain of is this: They simply complain of the trouble of keeping these gratings clean, but we cannot entertain that.

8022. I suppose where a man has a particularly long distance to go up a mill-race, in cases of that kind you grant exemption?—Yes, we have done that in several cases.

8023. Is it not the fact that very often the right kind of gratings are not erected?—Very often.

8024. In other words, if proper kind of gratings are erected, do they interfere with the working of the mill in the least?—I think not.

8025. Coming to the question of turbine protection, what do you think of that Cork Corporation granting as a protection to a turbine?—I should say it would be a very good class of grating, but I would be even disposed to allow a larger interval between the bars.

8026. That is three-eighths of an inch?—I should say four-eighths or five-eighths of an inch would be sufficient.

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8027. Some

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Mr. HORNER.

[Continued.]

Mr. Selon-Karr—continued.

8027. Some witnesses have said five-eighths of an inch, I believe?—Yes.

8028. Do you agree with that view?—I do.

8029. I think you are of opinion that the onus of protecting these turbines should be on the shoulders of the millowners?—I think so.

8030. Have you stated your reasons for that view to the Committee?—I have not.

8031. Will you state your reasons shortly?—The principle is this, that if the millowners derive greater advantage to their water power by improved machinery, which machinery is to a certain extent or in a greater degree more destructive to smolts than the ancient form of bucket wheels, then I think they ought to take steps to prevent this destruction, because after all, this is a question which affects the public. It is not a question of a proprietor of a mill against the proprietor of a fishery; it is a question of the public as well. In this particular district it so happens that the Irish Society have large fisheries. But take other districts where you have numerous small proprietors in the upper waters, and a large number of men fishing for their livelihood in tidal waters, on their common law right. If you destroy an undue proportion of smolts the fish of the river must decline, and if it declines their livelihood is injured.

8032. Are you clearly of opinion for those reasons that the onus should be on the shoulders of the millowners to protect their turbines?—I think so, because I do not think boards of conservators have funds to do it; in fact I know they have not.

8033. Comparing for a moment the question of gratings and the question of turbine protection, it is far more important, is it not, in your view to protect the turbine than it is to erect gratings at head and tail-races?—I think so.

8034. It is far more important to have the law on that point strictly and clearly defined, is it not?—I think so.

8035. I suppose far greater injury would be done to the interests you mention by the destruction of smolts than by the destruction of salmon?—I think so, but at the same time, if you have a mill that requires a grating on the tail-race and you have a large destruction of gravid fish going up, that involves an enormous loss too.

8036. I was only comparing the two; I am not suggesting it is unimportant to keep the gratings up, but is it your view that the protecting of a turbine or rather the protecting of smolts from entering the turbine in an efficient manner, is in your opinion, if anything, a more important question?—Yes, I think it is.

8037. That is your view, is it?—Yes, it is.

8038. Are you in favour of in any way extending the power of exemptions to turbines?—Yes, I should like to see that done very much. I have always felt that we were rather handicapped under the existing law.

8039. In what way?—In some cases where there are turbines, and from the position of the intake the smolts are not likely to go down, we have no power to give exemption, and the proprietor says, "The law requires me to keep up this grating; you are perfectly well aware that smolts do not come down there; why can-

Mr. Selon-Karr—continued.

not I have an exemption?" But under the present law we cannot give him one.

8040. You are powerless in the matter, are you not?—Yes.

8041. Do you think the fishery owners would be quite satisfied that you should have a power of exemption in the case of turbines?—I think so.

8042. As you now have with regard to gratings?—I think so as far as I am aware.

8043. With regard to the Bill now before the Committee, would you kindly state shortly (of course we have had other evidence on this, but we should like to have yours in corroboration) what are your objections to the working of that Bill?—I think the Bill would be utterly unworkable. In the first place as regards widening the head-race, the in-take of water turbines, the board of conservators would neither have the funds or the power to acquire land for such a purpose, and to my mind every miller where a board of conservators proposed to erect a grating would at once start some objection, and say that it would interfere with his water power; he might decline to allow the people to go on the land, the land might not be his; the land might not be purchasable.

8044. Are all these things which you mentioned strong arguments for throwing the onus on the millowner?—The strongest argument of all is, that the boards of conservators have no funds to do it.

8045. Do you think the Bill would be either unworkable or would give rise to litigation?—I am sure it would give rise to litigation, and the fear of litigation would render the Bill a dead letter. Boards of conservators would not undertake costly litigation, because they would be ruined by it.

8046. Then if that Bill was a dead letter, if it was passed into law, it would mean really, would it not, that turbines might be erected of all kinds without protection of any kind whatever being put up to prevent smolts going in?—Yes.

8047. To put it shortly, it takes away all the present safeguards and substitute something which you say would become a dead letter?—It substitutes the shadow for the substance; that is what it does.

8048. I think you have told the Committee that you are confident that such gratings, as that Cork Corporation grating, for instance, or others, perhaps better, can be erected without injuring the flow of water?—Of course, every grating you put up must injure the flow of water more or less, but I think a grating of that class would not make any appreciable difference to the flow of water to a turbine.

8049. You have had a great deal of practical experience of these matters; do you think there would be any difficulty in reconciling the two interests of the fishery owners and millowners in this respect?—I do not think so from what I have seen of millowners.

8050. Do you think the agitation in favour of this Bill is a local agitation or not?—Purely and entirely.

8051. From what district?—About Ballymena.

8052. Do

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[Continued.]

Mr. Seton-Karr—continued.

8052. Do you think it is an individual agitation?—I do.

8053. Arising where?—Arising out of Mr. Webb's case.

8054. Do you strongly hold the view that that is so, and that it is a purely individual agitation?—There is no doubt that it was initiated there; it was an unfortunate thing altogether. It, of course, has already been given in evidence here, and there is no use my repeating it.

8055. Do you thoroughly endorse everything that has been said from that point of view?—Thoroughly.

8056. I believe that you have always explained to the millowners and factory owners and their managers that the Fishery Department would not enforce requirements which would be of real injury to the working power of their mills and factories?—Invariably.

8057. That is the stand which you, as a government inspector, have always taken with your colleagues, is it not?—Certainly.

8058. And, as a matter of fact, I take it that under the present law, at all events, as it is working, no injury has been or is being inflicted on the mill industry?—None whatever.

8059. I believe you are prepared to make some observations on Mr. Webb's evidence; I do not want to go too much into detail, but is there anything very material you would like to call our attention to in that evidence?—I do not want to say anything personal to Mr. Webb, but in justice to the Dublin district I would say this: Mr. Webb stated that there was no fishing in tidal waters there; Mr. Webb is entirely wrong. There is a fishery in tidal waters in the Liffey, and the number of nets taken out last year were 25 draught nets, each worked by six men; that is 150 men who gain their livelihood in the tide-way of the Liffey. I wish to mention that in justice to those men, who have their rights as well as everybody else.

8060. You speak of your own knowledge, of course?—Certainly, I have the return of the licences here.

8061. Do these men live entirely by that industry?—Entirely, during the season.

8062. And do they catch a considerable amount of salmon there?—Yes.

8063. What can you tell the Committee shortly on the subject of fish passes; is there any material point to which you would like to call their attention?—I think in many places fish passes are badly required, but I think many of these weirs in this district which is now more especially before the Committee, at the time when salmon are running, are perfectly accessible to salmon.

8064. Do you think that proposing a Bill of a larger scope was brought in in another Session on the subject of the Irish Salmon Fisheries, there ought to be a clause with reference to fish passes in it?—Decidedly, the law is most unsatisfactory as a law throughout Ireland. There is no power at all except by indictment, which we have tried, as you have been already told.

8065. Practically, then, the law on the subject of fish passes is also a dead letter, is it not?—To a great extent it is.

8066. I gather you do not think it is quite
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Mr. Seton-Karr—continued.

such an important question as the question of protecting smolts from turbines?—I do not think it is. It is an important question in other parts of Ireland where the weirs are higher and where the fish are pounded below the weir until there is a large fresh, and where you must have very heavy water over the weir to get them up. That is a very important matter with regard to the question of fish passes, but in most of the small weirs with any fresh there is a considerable body of water coming over the crest of the weir.

8067. And when the salmon take it into their heads to do so they can easily get over the weirs, can they?—I think so.

8068. Are there many places in Ireland where, to your knowledge, the millowners have taken advantage of the fact of the law being a dead letter to raise their weirs?—Yes, a great many; that is a common practice.

8069. That is contrary to the letter of the law, I understand you to say?—Quite.

8070. And yet they do it?—Yes.

Chairman.

8071. And is it injurious to the fisheries?—Yes, because it stops the ascent of the fish altogether.

Mr. Seton-Karr.

8072. That is a point, I take it, on which it is required definitely to define the law?—Yes.

8073. Namely, the license of millowners to raise their weirs?—Yes, without erecting a fish pass.

8074. I said defining, but I suppose you would say it requires amending on that point?—Yes, I would.

8075. Do you think that a law which compels all millowners in the erection of new weirs to put in a fish ladder or pass would interfere with the working power of their mills?—I do not think it would.

8076. That is a point on which the law requires to be amended, I take it?—I think so.

8077. As a matter of fact, when a millowner now erects a new weir, does he put in a fish pass?—Some of them do. At the Cork Waterworks, where there is a new weir, the Waterworks Committee of the Cork Corporation put fish passes in.

8078. But if a millowner does not like to, there is no power, practically, to compel him to do so, I understand you to say?—There is no power.

8079. Unless the responsibility of doing that was placed on the shoulders of the millowners, they would, I suppose, object to anything that the fishery owners or conservators propose to do in that respect?—I should say so, certainly.

8080. Does it not sometimes happen that the weirs are not made water tight?—Very often.

8081. And do the millowners lose a good deal of water in that way?—There is an enormous amount of leakage in some weirs that I have seen.

8082. That is a bad thing for both industries, I take it?—Yes.

8083. It reduces the amount of water for the fish to ascend, and it reduces the flow of water to the mill?—Yes.

8084. Do you think the number of turbines
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[Continued.]

Mr. Seton-Karr—continued.

will continue to increase in Ireland?—I think so; they seem to me to be increasing every day.

8085. And therefore the number of mill weirs will increase, I suppose?—Not necessarily, because they may substitute turbines where water wheels exist now.

8086. How many turbines are there in Ireland now?—About 87 now outside the district under discussion.

8087. How many are there in the Coleraine district?—Nineteen, I think.

8088. I suppose if the weirs were made properly water tight, that these turbines would have a much better flow of water, and that they would in consequence be able to put up these fry guards without much injury?—I should say so.

8089. Then does it come to this, that many cases where the millowners complain of the want of flow of water is arising very often from their own fault in not properly constructing their weirs or making them water-tight?—Yes, that is my opinion, formed from seeing these places from time to time.

8090. Have you seen all these 87 turbines you speak of, or the majority of them?—No, I have not; I have not been called upon to inspect many of those.

8091. I suppose you are familiar with all those in your own district?—Yes, most of them.

Chairman.

8092. Can you give us generally the value of fisheries to Ireland; we have it on record that the sale of fish, as I understand it, amounts to about 600,000 £ a year?—Yes, that is so.

8093. How is that estimate arrived at?—It has been arrived at by the wholesale prices of fish consigned to the various markets in England.

8094. That is the quantity of fish sent to the various markets, is it not?—Yes.

Mr. Seton-Karr.

8095. I think you have figures which you can give us shortly of the quantity of salmon conveyed over the Great Northern and Northern Counties Railways in 1891?—Over the Great Northern in 1891 there were conveyed 3,474 cwts., which at 1 s. a pound would amount to 20,000 £. Over the Northern Counties Railway there were conveyed 2,800 cwt., which at 1 s. a pound would be about 54,000 £. I take it also at a lower price of 8 d. per pound.

Mr. Macartney.

8096. That is rather low, is it not; 1 s. 4 d. would be the average, would it not?—Yes.

Chairman.

8097. Roundly, you say that the fishing industry is worth 600,000 £ a year to Ireland?—I say so.

Mr. Seton-Karr.

8098. Do you think that is a fair estimate?—I think it is.

8099. On these two railways the total amount of salmon conveyed for one year at 1 s. a pound gives a value of 74,000 £, does it not?—Yes.

8100. If you take it at 8 d. a pound, it gives a total value of 50,600 £?—Yes.

Mr. Seton-Karr—continued.

8101. Is that the method by which you arrive at the 600,000 £?—That 600,000 £ was arrived at before my time; I did not make the calculation. That has been arrived at some years ago.

8102. You are speaking merely of two railways, are you not?—Yes; and of what was actually carried by them.

Chairman.

8103. I suppose there are some sent that would not go by railway at all, but which are landed by boats and not put on the railway at all?—Yes, they go by sea.

8104. I should think at Liverpool a great quantity would never go on to the railway at all?—Yes, that is so; a great deal goes by boat.

Mr. Seton-Karr.

8105. Did you read Mr. Maxwell Gault's evidence?—Yes.

8106. Have you any observation to make upon that?—Yes; Mr. Maxwell Gault said, that he had set the law at defiance, inasmuch as he had declined to erect a grating at his head race; as a matter of fact Mr. Gault had got exemption for the entire year save two months, December and January, from us. He also got an entire exemption for his tail race, but that he explained.

8107. As a matter of fact, did he keep up his grating for two months?—No.

Mr. Macartney.

8108. He said he had got an exemption!—For the head race, but not for the tail race.

8109. Question 937 is, "You got an exemption, I believe, for the grating at the head and tail race?"—(A.) The grating at the headrace we never put on at all, simply because our race is so long that we could not possibly keep a man there all the time to keep it clear, which would have been necessitated if we had. We had it on the tail race, and suffer very serious damage from it, and Mr. Hornby visited the place one day and gave us exemption."?—Quite so.

8110. I understood he had got an exemption for both?—No, he got an exemption save for two months in the year. One was an entire exemption, and the other was for two months.

8111. One he had never put on at all, and the other he had. Then I ask him: "(Q.) But with regard to the head race, you have not complied with the order, have you?"—(A.) We have not. (Q.) And you have not complied with the order as regards the wire netting, have you?"—(A.) We did comply with it; but we found it impracticable to work, and we abandoned it."?—I merely mentioned it, because that read as if we were enforcing impossibilities; I only wish to explain that.

Mr. Thompson.

8112. Have you ever made any experiments as to the possibility of fry getting through turbines?—I made one at Galway.

8113. What sort of a turbine was that?—It was a Hercules turbine.

Mr. Seton-Karr.

8114. Is there anything material in Mr. John Robinson's evidence that you desire to call the attention

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[Continued.]

Mr. Seton-Karr—continued.

attention of the Committee to?—Yes; Mr. Robinson stated to an honourable Member that he got an exemption for that which he had not put up; but he did not get an exemption for that which he had put up, which seems rather to require some explanation. It was in answer to a question of Mr. Russell.

8115. At Question 1343 Mr. Russell says, "Then am I to understand that the Irish fishery inspector gave you an exemption for that which you had not erected, and declined to give you an exemption for that which you had erected?—(A.) Yes. (Q.) That is a most extraordinary thing, is it not?—(A.) That is the fact." We would like to have your story about that?—The fact is this, that we had no power to give an exemption for a grating at his turbine. The other was the ordinary grating, which we thought would do him an injury, and therefore we gave him an exemption. That is the real fact about the matter.

8116. Did he ask for an exemption for the grating?—He asked for an exemption, but we pointed out that the law did not enable us to give him that exemption.

8117. Then you gave him an exemption so far as it laid in your power to do so, did you?—We did, so far as it laid in our power.

8118. With regard to Mr. Perry's evidence as to the experiments carried on at his turbine with fry, can you tell us anything about that?—Yes; I was present there with his partner (who took a great deal of trouble and was very kind and friendly in every way), and Mr. Miller, the lessee of Galway Fishery, and some others. Mr. Miller provided the smolts which were lowered down first with the turbine going at a low rate of speed. The reason of that was to uncover the turbine so that we might be in a position to see whether the smolts entered between the shields. We put in about 25 smolts, the turbine revolving at a low rate of speed, having a netting across the tail race, and then we tried again at a greater rate of velocity, putting in the remaining 25 smolts, but we failed to discover any smolts injured afterwards; smolts were seen in the tail race, but it is quite possible those smolts might have been inhabitants of the tail race, because it is frequented by smolts. It was not a satisfactory experiment.

8119. You found no injured smolts at all afterwards, did you?—No, none.

8120. You do not attempt to explain how that was, do you?—No, I do not.

8121. Supposing the smolts had been injured, they might have been washed down in each side of your netting, I suppose, without getting caught?—They might, but I think the probabilities are, if they had been injured, we would have seen them, because we watched the tail race very carefully. There were a good many anglers there, who were very keen to detect an injured smolt, if there had been one.

8122. In your opinion the experiment was not satisfactory?—I think not.

8123. Can you draw any conclusion from it?—No, I think not; I think Mr. Perry's partner, Mr. Pearce, thought the same thing himself.

8124. Do you think turbines do injure smolts?—I think many classes of turbines must.

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Mr. Seton-Karr—continued.

8125. That was the only fry experiment you were present at, I believe?—That was the only one.

8126. Was your department called upon by the Government to report on Mr. Macartney's Bill?—Yes.

8127. What did you report, shortly?—The question is whether that report is not a confidential report; I should rather say it was.

8128. Then you are not able to hand a copy in to the Committee?—Not without the permission of the Government.

8129. Subject to leave from the Government, or the Lord Lieutenant, are you prepared to hand it in?—Certainly, my objection is only a mere matter of official etiquette; I have no objection personally in the world.

Mr. Tomlinson.

8130. Was the experiment you have referred to the only one you have made?—That is the only one.

8131. How long have you been superintendent of these rivers in the north of Ireland?—About eight years.

8132. Have you noticed any tendency amongst the salmon to diminish during that time?—Yes; in the River Bann they have declined enormously.

8133. But not so much in other rivers?—No, not so much the other rivers, but the tributaries of the Bann are more or less affected too.

8134. I suppose any difficulty the salmon might have in living in the tributaries of the Bann would affect the whole of the fish in the Bann?—Naturally.

8135. You have been present, I think, a good deal during the sittings of this Committee?—I have.

8136. Have you heard a good deal of the evidence?—Yes.

8137. Do you agree in that part of the evidence, given by some of the witnesses, which speaks of the loss from fish collecting below the weirs when they are going up the river?—I think they might be poached below the weirs.

8138. Do you think it a correct statement to say, that they very often deposit their spawn below the weirs from inability to get over the weirs?—I would not endorse that statement at all.

8139. Or that they are so crowded below the weirs, that they actually die of starvation?—I wish they were so crowded in some of those rivers.

8140. I do not think that was stated in the Bann, but there was evidence of that kind given?—I do not remember at this moment that particular portion of the evidence.

8141. You say that a five-eighth grating would probably be sufficient to stop the smolts?—That is my impression; a four-eighth or five-eighth-inch grating would be sufficient.

8142. Supposing you had a five-eighths grating of that kind, would that enable you to dispense with a further grating at the bend of the race?—Yes, I think it might.

8143. In fact, so far as concerns the smolts, that would be a sufficient protection (I am not speaking about particular dimensions) for all purposes, would it not?—Yes.

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8144. What

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[Continued.]

Mr. Tomlinson—continued.

8144. What about the tail-race gratings?—The tail-race gratings are two-inch gratings under the other section.

8145. Tail-race gratings are to prevent the gravid fish ascending and being destroyed in the tail-race, are they not?—Yes.

8146. Do you still advocate giving up tail-race gratings?—Yes; in some cases it is necessary, because in a case where a mill takes the entire water of the river the waste water forms the main body of moving water, and then the bed of the river is dry, perhaps.

8147. What would the salmon do supposing they were stopped by a grating at the tail-race?—Drop back into any deep pools there were, until there was a fresh in the river, and then they would go up.

8148. Have you had any complaints about the difficulty of keeping tail-race gratings clear of obstruction?—Yes.

8149. Have you ever considered the proper form for a grating at a tail-race?—We have diagrams which were prepared some years ago.

8150. One of the witnesses spoke of a grating which was self-cleaning to some extent, a grating which opened outwards to let things through?—Yes.

8151. Do you know of any such grating?—Yes; that is a very good device.

8152. Would that be very expensive to put up?—No, I do not think so.

8153. Have you formed any idea as to what the cost of putting up a five-eighths-inch grating would be?—The cost would vary very much with the size of the waterway and the formation of the lead on both sides. If you had to put up masonry of course it would be more expensive. In many cases you have masonry ready there.

8154. Would there be many cases where it would be necessary now, in the case of existing mills, to provide frameworks to put the gratings in; are there many that have frameworks?—No, I think the gratings in many cases might be placed quite close to the regulating sluice, which must have masonry inside to support it.

8155. I suppose you would not put this five-eighths-inch grating in the place of the large grating which is generally at the head of the race?—No.

8156. What is the objection to that?—I think that it would interfere perhaps with the water power more. It would be very hard to keep it clear, to begin with, and it would become choked in such a way that it might injure the turbine in perfectly under the control of the miller; he has only just to walk out and clean it. The other would perhaps involve walking out a mile or half-a-mile to clear it.

8157. Do you think that the conduct of the water bailiffs causes any friction between the millowners and the conservators?—I think it has at times.

8158. What class of men are they generally?—In many cases a very low class of men. But I must say the men in the northern districts are a very much better class of men than the men in the south and west.

8159. It is desirable you should have respectable, honest men, is it not?—Yes, but then it is

Mr. Tomlinson—continued.

a question of money. You will not get a good class of men unless you can pay him, and boards have no funds to pay them.

8160. And if you do not have a respectable class of men, the value of your river, I suppose, would diminish?—No doubt about it.

8161. Have you seen this draft Bill with the proposed amendments?—No.

8162. Does it emanate from you at all?—No, not in any way.

8163. Can you offer any comments upon it?—No, the Government are not interfering before this Committee, therefore I do not feel myself open to offer any suggestion of the kind.

8164. Do you think if you had a power of exemption from the necessity of putting up a grating of this kind, you would be able to find some turbines safe to be exempted?—I think so.

8165. Have you any reason to doubt the substantial cogency of the experiments Mr. Webb described at the last meeting of this Committee?—I have no reason to doubt what Mr. Webb stated.

8166. There is no *prima facie* improbability in his account which would lead you to think so, is there?—All these experiments are more or less unsatisfactory. To carry out an experiment like that, a series of experiments should be carried over a period of time and not one isolated case.

8167. Would that observation extend to Sir Thomas Bmdy's experiments as well as Mr. Webb's?—To every experiment of that class unless carried on over a considerable period.

8168. I suppose there are other causes of diminution of salmon besides the gratings?—Yes.

8169. Do you agree with the late Mr. Buckland in the opinion that American weed is destructive to salmon?—Not altogether. I do not think the American weed would flourish in the places where salmon spawn.

8170. Is flax water injurious?—No doubt it is, but the offences against the law as regards flax water have not increased; I think they are very much the same as they have been.

8171. Do you think poaching has increased?—I do not think so. There is always a considerable amount of poaching.

Chairman.

8172. I want to ask you a question on the cost of putting up gratings at the head and tail races; how many mills are there on the Baon Navigation and tributaries in round figures?—About 50.

8173. That would be 100 gratings which would have to be put up, would it not?—Yes.

8174. The cost of which would be divided amongst 50 millowners, if they had to put them up, but which would all fall on one fishery owner if he had to put them up?—Quite so.

8175. So that it would seem to create an unfairness to the fishery owner; to the millowners it would be a trifling sum; but to him it would be of considerable consequence, would it not?—The fishery proprietor, unless he were a very wealthy man could not do it simply.

8176. Therefore you do not approve of this suggestion that the fishery owner should be the

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Mr. HORNBY.

[Continued.]

Chairman—continued.

the expense of putting up these gratings, do you?—I do not.

8177. I think the public are not generally aware that the salmon fishery industry, and the supply of salmon in the sea, is only provided by the preservation of salmon fry up the river?—That is distinctly so.

8178. If the preservation of the salmon fry up the rivers is neglected, the salmon fisheries go altogether, do they not?—Certainly; if you destroy your nursery you have no crop.

8179. Salmon will not go to other countries, and come back again to our shores?—Oh, no.

8180. The vulgar notion is that it is the sea that produces the salmon, and that they only go up the rivers for a little summer amusement?—No; it is often the small streams that produce the salmon, and if those small streams are not protected you will very soon have no salmon at all.

Mr. O'Neill.

8181. With reference to the question about the hundred gratings which you say would have to be put up, are not those gratings nearly all there now?—No, they are not at the turbines.

8182. I think there are a good many gratings up, are there not; it would not be like starting a new thing altogether, and putting up a hundred gratings, would it?—But then the existing gratings will not last for ever, and must be renewed, and someone must renew them.

8183. Do you know how many gratings there are up now?—I can give you a return of them, but I could not tell you off hand at this moment, because there are a good many exemptions, except for a short period of the season.

8184. We had it in evidence that a great many of the millers had had the gratings, but did not use them, and left them on the bank?—Yes, but then a great many gratings are put up which are certainly not put up in a proper and permanent workmanlike manner, like the thing you had before the Committee. That is not a proper grating, either for the millowner or for the fishery owner.

8185. Do you approve of this Cork Corporation grating?—I think even that might be a little wider, say four-eighths or five-eighths of an inch, but I think the principle is right. It is easy to clean and it is easy to erect.

Mr. Macartney.

8186. The only experiments I think you made were those at Galway?—That is so.

8187. Do you remember the size of the turbine?—No, I do not remember that.

8188. You were asked by the Chairman a question about the smelts whirling round inside a turbine?—Yes.

8189. I do not know whether you are at all an authority on turbines, and I do not know whether you are aware that the whirlpool chamber, where they are whirled round, is practically the best safeguard smelts can have; apparently it was an invention of a well-known Belfast man, Sir James Thompson, and has been adopted in the turbine as practically a safeguard which they have in getting through a turbine?—Just so.

8190. Your theory is, I understand, that the

Mr. Macartney—continued.

millowners who have derived considerable benefit from the increased power they get by the turbines, should pay for the damage which is supposed to proceed from them to the fishery interest?—I think so.

8191. Would you apply that all round in Ireland; for instance, take flax water, that does a considerable damage to the salmon fishery, does it not?—Yes.

8192. Do you think it would be possible to pass a Bill through the House of Commons which would throw on the occupiers of land who grow flax and turn their waters right and left into the river, and who derive a benefit from growing flax, a liability to compensate the fishery owners?—I do not say that, but I say farmers ought to be compelled to put the water over their lands, and not let it run into the rivers.

8193. But you know they are compelled by law, do you not?—But they do not do it.

8194. Benchers of magistrates, and judges, and juries do not convict them, do they?—That is so.

8195. Popular opinion would be rather strong against your theory, would it not; it may be a sound one, but it would be impracticable, would it not?—I do not think it would be impracticable.

8196. As a matter of fact, the flax-water law is a dead letter in Ulster, is it not?—Yes; that is owing to the action of magistrates.

8197. I suppose if the turbine wheel owners were as numerous as flax growers, any law which Parliament might pass with regard to them would be also a dead letter, would it not?—I do not know.

8198. You told the Committee that you think there ought to be a power of exemption for the turbine?—I did.

8199. And your late colleague, Sir Thomas Brady, holds the same view, does he not?—Yes.

8200. In your view, the position of mine is not satisfactory at the present moment, is it?—No.

8201. That is because, practically, the law is a dead letter?—Quite so.

8202. And you have felt obliged, as an inspector of fisheries, to give exemptions pretty freely in the district, have you not?—Yes.

8203. You were asked some questions with regard to weirs. In your opinion, does the Bill which has been referred to this Committee deal with weirs and fish passes?—No, I should say not.

8204. What proportion of the 600,000 £, at which the Irish fisheries are valued, would go to the owners of the several fisheries?—I suppose about an eighth part would go to private several fisheries.

8205. What proportion of the 74,000 £, that goes over the Northern Counties and Great Northern Railways would go to the owners of the several fisheries?—A large proportion of that would, because that is a peculiar district.

8206. The several fisheries in Ulster relatively to the other fisheries are very valuable, are they not?—Yes.

8207. A considerable proportion would go to them, would it?—Yes.

8208. Considerably over half?—Yes, I suppose it would be so.

n x 4

8209. Your

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Mr. HORSNEY.

[Continued]

Mr. Macartney—continued.

8209. Your calculation was that at 1s. a pound it would produce 74,000 *l.*, and my basis of 1s. 4 d. would make it 98,000 *l.*, very nearly 100,000 *l.* a year, would it not?—Yes.

8210. I think you told the Chairman that your opinion was that some turbines were injurious and some were not?—Yes.

8211. They are not all equally injurious, in your opinion?—I think not; I think that is admitted on all hands.

8212. Is it quite an open question with some sorts of turbines, whether they do any material damage to the sluices?—I think it is. Some Members of the Committee expressed a wish to see the plans for gratings, and I have brought a copy.

Mr. Seton-Karr.

8213. Did you hear Mr. Perry's evidence?—Yes.

8214. Did he not make a statement that the erection of fry-guards at a certain mill would interfere very much with the flow of water?—Yes; that is at his works at Galway.

8215. Have you an observation to make upon that?—I was rather surprised to hear him say that. I have seen the place, and as he is an engineer I should not like to say he is wrong, but it seemed to me he was. He has the whole of the water of Lough Corrib to drive his machinery.

Mr. Seton-Karr—continued.

8216. Do you think he is possibly wrong in that statement?—I think he is a little wrong about his water power, and he has formed rather to my mind an erroneous idea. I cannot understand his evidence on that point, because there is an enormous supply of water there.

8217. He is singularly well off for water power, is he not?—I should think so.

8218. In your opinion would an ordinary fry-guard interfere with his water power?—I do not think so.

Mr. Tomlinson.

8219. Referring to those plans which you have just handed in, I see in the first one you put the fry-guard outside the sluices?—Yes, it is outside the sluices.

8220. As I understood your answer to my question, a fry-guard in this position might tend to stop the flow of the stream?—Yes; this fry-guard was put up under the Act of 5 & 6 Vict. This is not the fry-guard relating to turbines; this was a fry-guard which related to every wheel turned by water.

8221. What is the nature of this fry-guard? (*The Witness explained the diagram.*) This may be considered to be an extinct species of guard, may it?—Yes, and it never was, enforced in fact.

A P P E N D I X.

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A P P E N D I X.

APPENDIX, No. 1.

PAPERS handed in by Mr. R. L. Moore, 2 May 1892.

(A)

Election of Conservators of Fisheries, 1891.—(No. 15—2 or Coleraine District.)—Salmon Fisheries Acts (Ireland).
32 & 33 Vic. c. 92, and the Acts incorporated therewith.

WHEREAS the Board of Conservators elected in October 1889, for the district known as No. 15—2 or Coleraine District, will cease to exist in the month of October next, and a new board is to be elected. We, the Inspectors of Irish Fisheries, call the attention of those interested in the Fisheries, to the following provisions and regulations in respect to such—

Election of Conservators of Fisheries.

The Elections for the District of Coleraine which extends from the sea point of the townland boundary between the Townlands of Downhill and Drumagully to the point of Portrush, should be held—For the Upper or Freshwater Electoral Division (B.) on or about the 3rd October next, and for the Tidal Electoral Division, on or about the 6th October next. The numbers of Conservators to be elected are as follow :

I. For the Tidal Electoral Division (A.), which comprises:—

The whole of the sea along the coast and the midway and tidal portions of all rivers flowing into the sea between the sea point of the townland boundary between the Townlands of Downhill and Drumagully, and the point of Portrush. Four Conservators.

II. For the Upper or Freshwater Electoral Division (B.), which comprises:—

The whole of the freshwater portions of all rivers and their tributaries, flowing into the sea between the townland boundary between the Townlands of Downhill and Drumagully and the point of Portrush. Four Conservators.

1. The present Board of Conservators shall fix and publish notice of the times and places for the meetings of electors, in each electoral division, for the election of Conservators for the same, and the number of Conservators as already settled to be elected for each electoral division.

2. Two weeks' notice thereof shall be given by hand bills and advertisements in two or more newspapers circulating in the district.

3. The meetings for elections shall commence at the hour named in the notice to be published by the present Board of Conservators, and no vote shall be received after Three o'clock in the afternoon of the day so fixed.

4. Every person shall be entitled to vote at such meetings who shall have paid license duty for the current year within the electoral division only for which such meeting is held, and so others.

5. Such persons shall choose a chairman to preside at such meeting, who shall receive the votes of the electors.

6. No person shall be eligible for the office of Conservator in any electoral division in which he does not reside or possess real property.

7. All persons shall produce their licenses for the current year at the time of voting.

8. Persons entitled as aforesaid to vote at such meetings shall be entitled to have a vote or votes thereof, according to the following scale (that is to say) if the license duty paid—

| | | |
|---|-----------|--------------|
| Shall not amount to 2 <i>l</i> . | - - - - - | One vote. |
| Shall amount to 2 <i>l</i> , and not amount to 5 <i>l</i> . | - - - - - | Two votes. |
| Shall amount to 5 <i>l</i> , " " 10 <i>l</i> . | - - - - - | Three votes. |
| Shall exceed 10 <i>l</i> . | - - - - - | Four votes. |

9. A person voting by proxy shall endorse upon his license the name of the proxy whom he authorises to vote for him, and place his own signature immediately under the name of such proxy.

10. When any license is used by a proxy for voting purposes at the election, it must bear thereon a penny stamp, and be produced by the proxy at the time of voting.

11. The proxy who seeks to record the votes on such a license must himself be a qualified elector, i.e., he must have paid license duty himself in the electoral division in which he seeks to vote.

12. The chairman of such meeting shall declare the persons who shall have received the greatest number of votes to be the elected Conservators, and shall certify under his hand the election of each Conservator, and furnish him with a certificate which shall be sufficient authority for him to act as a Conservator, and shall also within four days after such election cause a list of such Conservators, with a statement of the residence and post town of each to be transmitted to our office, Dublin Castle, and shall also publish the said list in one or more newspapers circulating in the district.

Note.—The persons elected, as aforesaid, together with the ex-officio Conservators (who are, all persons possessing a several fishery as owner, lessor, or occupier, valued under the Acts for the more effectual relief of fish).

of the poor in Ireland, at one hundred pounds yearly or upwards, provided that when a fishery so rated shall be held by several persons, one person alone shall act as Conservator; and all magistrates paying license duty, and being owners of land abutting on rivers, shall conjointly form a Board of Conservators of Fisheries for said district.

Given under our hands this 31st day of August 1891.

Thomas F. Brady,
Alon Hervey,
Wm. Spotswood Grant.

Note to p. 12.—Forms of certificate to be furnished to each Conservator when elected are supplied by the Inspector to the different clerks of the Boards of Conservators.

(B.)

Election of Conservators of Fisheries, 1891.—(Coleraine District, No. 15—2).—Salmon Fisheries Acts (Ireland), 52 & 53 Vict. c. 92, and the Acts incorporated therewith.

Notice is hereby given that, pursuant to the provisions of the above Acts, the Conservators of this District hereby require all persons who shall have paid License Duty for the year 1891, to assemble at the times and places hereinafter mentioned, for the purpose of electing Conservators for each Electoral Division in said District, in conformity with the terms of the Acts before recited.

| Electoral Division. | BOUNDARIES. | Number of Conservators to be Appointed. | Time of Meeting. | Place of Meeting. |
|---|---|---|--|--------------------------------|
| Lower or Tidal Electoral Division (A.) | The whole of the sea along the coast, between the seaward of the townland boundary between the townlands of Downhill and Drumagilly, in the county of Londonderry, and the Point of Portrush, in the county of Antrim, and around any islands or rocks situate off the same, with the whole of the Tideway along said coast and rivers, and the whole of the tidal portions of the several rivers, and their tributaries flowing into the said coast between said points. | Four | Tuesday the 4th day of October 1891, at One o'clock, afternoon. | The Court-house, Coleraine. |
| Upper or Freshwater Electoral Division (B.) | The whole of the Upper or Freshwater portions of all rivers, lakes, and their tributaries, comprised and terminating in the tidal electoral division. | Four | Saturday the 3rd day of October 1891, at One o'clock, afternoon. | The Court-house, Toome Bridge. |

Note.—In the event of any electoral division failing to elect Conservators on the day appointed, the Conservators of other divisions shall act for the district. Each person desiring to vote will be required to produce his license for the year 1891, at the time of voting, and persons voting by proxy will be required to produce the license of the person whose proxy he holds, duly endorsed by the owner of said license.

No votes can be received after Three o'clock p.m. on either of the above days.

Signed on behalf of the Conservators of the district,

Dated this 4th day of September 1891.

Joseph Knight, Clerk to the Conservators,
Crumlin, County Antrim.

(C.)

Salmon Fisheries (Ireland) Acts Amendment, 1892.—Memoranda supplied by the Conservators of the Londonderry Salmon Fishery District, containing Resolutions, &c., in opposition to the provisions of the above Bill.

Sir,

I HAVE been directed by my Board to forward you the enclosed copy of Resolutions, unanimously agreed to at their meeting held here on the 17th instant, by which you will see that it is their opinion that the "Salmon Fisheries (Ireland) Acts Amendment," which you are endeavouring to have passed into law, will be most destructive to the fisheries of this country.

I am, &c.
(signed) Thomas Mathers,
Clerk to Conservators.

To W. E. Macartney, Esq., M.P.,
House of Commons.

At a meeting of the Board of Conservators of the Londonderry District of Fisheries, No. 15—1, held in the Board Room, Londonderry, on Wednesday, the 17th June 1891, the following Resolutions were proposed by J. A. Alexander, Esq., J.P., seconded by William Irwin, Esq., and unanimously agreed to:—

1. That the provisions in the Statutes at present in force in respect of gillings in the watercourses of mills situated on rivers frequented by salmon are just, and millowners are already adequately protected thereby.

2. That "turbines" are the most destructive class of mill wheel to salmon, salmon fry, and trout, and are rapidly supplanting the old "bucket wheels."

3. That

3. That the inspectors of Irish Fisheries have, under the existing law, at present power to grant exemptions, where necessary, to mill owners from being required to put in gratings.

4. That if it is necessary to revise the present Salmon Fishery Laws, that such revision should be general and not particular, and that the present Acts should be codified and revised by the Government, acting under the advice of the inspectors of Irish Fisheries and the several Boards of Conservators.

5. That the Bill to "Amend the Salmon Fisheries (Ireland) Acts" will, if passed, work a forfeiture of existing private fishery rights, as well as destroy a source of food for the public, without any equivalent public or private benefit.

6. That the proposed Bill contains no clauses providing for compensation to owners of salmon fisheries who must be injured by the removal of gratings in watercourses to mills.

7. That the several Boards of Conservators have not even funds sufficient to provide for the expense of watching the head-waters of the rivers in their respective districts during the spawning season, and have no funds under their control to apply to the erection of gratings, as proposed by the said Bill.

8. That the Bill provides the several Boards of Conservators with no funds for such purpose, and consequently, in effect, repeals altogether the law in respect of providing gratings in the watercourses of mills.

9. That even if such Bill provided the necessary funds for erecting gratings, the provisions of the Bill would be impetuous, inasmuch as it is not provided thereby how or by whom it is to be determined whether or not the erection of a grating "in any way interferes with the effective working of any mill," and no other existing Act so provides.

10. That the provisions of the existing English Salmon Fishery Acts in respect of "gratings" (and on the basis of which it is suggested that the provisions of this Bill are based) are entirely inoperative, and largely explain why salmon in almost all the English rivers have become extinct.

11. That it is understood that the inspectors of Irish Fisheries (who are men of large experience on this subject) are entirely opposed to the provisions of this Bill as being destructive of public and private interest and unworkable.

Resolved, That a copy of the foregoing Resolutions be sent to the Right Honourable A. J. Balfour, M.P., Chief Secretary for Ireland, and also to the Members of Parliament representing the City of Londonderry and the Counties of Londonderry and Donagall.

House of Commons Library,
25 June 1891.

Sir,
I need to acknowledge your letter of 23rd June, enclosing copy of Resolutions passed at a Meeting of Board of Conservators, Londonderry District. I regret that I am unable to agree with any of Resolutions, which, however, appear to me to have been adopted without an accurate appreciation of the facts upon which they rest.

I am, &c.

To the Clerk of the Conservators.

(signed) William Ellison Macartney.

ON SALMON FISHERIES (IRELAND) ACTS AMENDMENT BILL.

Office of Conservators of Fisheries, Londonderry,
9 July 1891.

Sir,
I HAVE received your kind favour of the 25th June 1891. The Resolutions passed by the Conservators of the Londonderry District, and a copy of which were sent you, were adopted after duly considering the evidence of men who have the experience of a lifetime in regard to the subject-matter.

Having had the opportunity of perusing your Bill, the Conservators of this District would be glad if you would afford them information on the following points:—

1. The only funds the Conservators have are obtained from the collection of licence duties paid in the district. These funds are not even sufficient to pay for the protection of the rivers in their district during the close season; and at present they are assisted largely by private contribution. From what source therefore are the funds to be obtained with which the Conservators are to carry out the provisions of the above Bill in regard to gratings, &c.?

2. Who is to prescribe the period during which gratings are to be placed in watercourses, &c.?

3. Will a "grating include a lattice or wire work," and if not, how are fry to be protected?

4. Who is to decide, and by what means is it to be decided, whether any proposed grating would interfere with the effective working of any mill?

5. How are the inspectors of fisheries to recover from a Board of Conservators the expense of widening such watercourses "as they shall deem expedient," assuming such board have available funds? And how, when they have no funds for such purpose, as before stated?

6. Who is to decide, and by what means is it to be decided, whether the erection of gratings at the mouths of streams "prejudicially interfere with water rights used for the purpose of manufactures, &c.?"

7. Where are the funds to be obtained by the Board of Conservators to defray the cost of erecting such gratings so last referred to, their present funds being deficient to defray the ordinary preservation during the close season, as stated?

8. Assuming the statement of this Board of Conservators to be true—that they have no funds with which to carry out the provisions of the above Bill—is it inaccurate to state that, so far as this district is concerned, the above Bill repeals in effect altogether the law in respect of the preservation of salmon, &c., in the erection of gratings in watercourses, &c.?

I am, &c.

W. E. Macartney, Esq., M.P.,
House of Commons, Westminster.

(signed) Thos. McKee, Clerk.

EXTRACT from "Irish Times," 5th August 1891.

MILLOWNEERS AND MILL GRATINGS IN ENGLAND.

Mr. Stokes, on behalf of Mr. T. M. Harby, asked the President of the Board of Trade whether representatives had been made to him that the law relating to the enforcement of gratings on mills in England, to prevent salmon entering the watercourses of mills, had been proved to be ineffective for the purpose; and, if so, was it on account of the deficiency or want of funds on the part of Boards of Conservators to erect such gratings, or whether the English Boards had sufficient funds to erect and maintain them; whether millowners in England had offered any opposition to put up such gratings on streams frequented by salmon; what was the general nature or character of the working power of the mills in England, that is, whether worked by bucket wheels or turbines; where gratings had been put, and what had been their diameter; at whose expense had they been erected, and in what places or at what mills in England had they been proved injurious to the effective working power of the mill; if any complaint had been made by any Board of Conservators, or any other persons interested, against the insufficiency of the present laws in England bearing on this subject; and, if so, what was the nature of the complaints, or the reasons given by them that the law was insufficient or ineffective?

Sir M. H. Bask.—I am informed that the Boards of Conservators in England and Wales complain generally of difficulties which they experience in the erection of gratings at mills, under the provisions of the Salmon Fisheries Acts, in consequence of the absence of a means of determining beforehand the differences which frequently arise between themselves and the owners of mills on the subject, and that in many cases they abstain from erecting gratings from fear of the expensive litigation which might ensue, their funds being in most cases limited. In the event of a decision being sought on the point whether a grating which had been erected was injurious to the power, it might be obtained by the owner of the mill under the 54th Section of the Salmon Fishery Act, 1873. I am not aware of any case in which the question has been tried. The mills are, in the majority of cases, worked by wheels, either overshot or undershot, but of late years, in many instances, turbines have been introduced. A return of all the gratings which have been erected could only be obtained by application to each Board of Conservators, and it does not appear that the utility of such a return would be at all commensurate with the labour involved in its preparation. I am not aware that any gratings injurious to the milling power are maintained.

APPENDIX, No. 2.

PAPER handed in by Sir Thomas Brady, 24 May 1892.

EXTRACT from the "Freeman's Journal and National Press."—22nd April 1892.

OUR SALMON FISHERIES.

To Editor of "Freeman and National Press."

Dear Sir,

It strikes me that neither the Press nor the public are sufficiently alive to the dangers that threaten our salmon fisheries. If all the allegations made against the destructive character of turbines when salmon fry are descending to the sea be correct, then the danger of extinction of our salmon fisheries in the rivers where such machines are used for milling power without being properly protected against the ingress of the fish, are imminent. In 1893 a select Committee of the House, over which the late Mr. McMahon, M.P. for Wexford, presided, investigated this amongst other subjects connected with the fisheries. The late lamented John A. Healy, M.P. for Waterford, who was master of the subject, and then when no man took a deeper interest in the prosperity of the fisheries, and indeed of every industry in the country, was one of the members of that Committee.

Evidence was produced before them of the great destruction of the young of salmon by turbines at mills. There was then no law requiring gratings or lattices to be put up to prevent the destruction of salmon or fry at mills. The result of the labours of that Committee was the passing of the Act of 1893, and amongst its provisions was one directing that where turbines or other similar hydraulic machines which might be injurious to salmon or the young of salmon in their descent to the sea were used, the persons owning or using them should, during the time of such descent taking place, provide grating or other efficient means to prevent salmon or young of salmon passing into the machine. Turbines were little used in those days, but where they were, and that efficient means had not been provided to prevent the ingress of fry, the fry were found dead in large quantities in the tailrace, notably at the Cock waterworks, on the River Lee.

The Legislature could, therefore, do nothing less than it did to preserve an important national industrial resource, affording remunerative employment to a large number of fishermen all round Ireland, from extinction, and which should have been the result if means had not been taken, as in Cork, to prevent the destruction of fry. I remember well when this destruction took place, and what a consternation was caused among not only the proprietors of fisheries in the river, but the large body of poor fishermen who were dependent for their daily bread on fishing in the tidal waters of the river. Since then the erection of turbines as a moving power for machinery has gone on extending year by year. They have lately become so numerous in one district in the North, and the complaints of the decrease of salmon in those rivers have become so widespread that the Conservators of Fisheries felt it incumbent on them to look more sharply after the matter and to enforce the law more strictly than they had done hitherto. In some places gratings were put up to prevent the ingress of fry during their descent to the sea, which takes place principally during the months of March, April, and May. In other places the owners refused or neglected to comply with the law, the result being serious diminution of fines, anger and bad blood generated between the fishing and the milling interests; and, finally, an appeal on behalf of the latter to the Legislature, for redress, which took the shape of the bill at present before Parliament to amend the salmon fishery laws. This Bill proposes to repeal all the clauses in the Irish fishery laws respecting gratings or the protection of turbines, and to substitute therefore provisions of the English laws, which are a dead letter and utterly useless, and, I may say, now obsolete from being impracticable to work. It has been referred to a Select Committee, who have been taking evidence on the subject since the 22nd March last, and the nature of which is, for the greater part, of the most vague and indefinite character. No one has positively stated that the turbines actually kill the fish going through, and no witness on behalf of the promoters of the Bill, whether owners or manufacturers of turbines or engineers, has gone much farther than saying they never saw a fish killed, or that they did not think they would injure the fry, and that they thought fry would pass through safely. On the other hand, those who use the turbines for manufacturing purposes allege that if they were compelled to put up such a close wire fencing as would be necessary to keep out fry it would be ruinous to the great milling industry of the North.

I, for one, would be the last man that would do any act to injure any industry in the country. We have, unfortunately, too few of them. Here, however, we have two great ones—the one, natural, producing about 600,000 annually and employing over 12,000 people, and likely to be increased materially under proper care, management, and protection and wise laws; the other, though artificial, depending on natural resources—the use of the water. I cannot admit any right in the latter to injure the former. Before mills were fish was, and mill-owners have no more than a right to the use of water in such a way that they will do no injury.

They know the consequences of causing an injury to any one either above or below them. But this is not a question between one private owner and another. It is one that vitally affects a large number of poor fishermen who fish round the coast, and in the tidal parts of rivers on their common law rights. It is only to the Legislature they have to look for protection. If turbines are of the destructive character alleged, and which was shown to be the case, at any rate in 1893, surely the present salutary law respecting them should not be repealed. If they are proved not to be so, I am quite sure, from my intimate knowledge respecting fishing interests, that those who possess them would not try to enforce any law that would injure the milling industry.

I believe both may be carried on with advantage and without injury to one or other by a little give-and-take principle. But I do fear, from my knowledge, however slight and imperfect it may be, that if the present Bill becomes

become, law, most serious consequences to, if not extinction of, the salmon fisheries in many places might follow. It therefore believes the public and all who desire to see our salmon fisheries a source of wealth and employment to the people, and food for the public, to be up and stirring at what, I believe, is a most eventful crisis in the history of our salmon fisheries.

As to the manner in which the laws have been administered by the Inspectors of Fisheries I will not enter into. Their public reports presented to Parliament will speak for themselves, and if any wrong statement is made therein, I presume it can be controverted.

I could say much more. The importance of the matter prevents me saying less, and I hope you will give this a place in your journal.

11, Percy-place, Dublin, 20 April.

Yours truly,
(signed) Thomas F. Dwyer.

EXTRACT from the "Freeman and National Press."—6th April 1892.

IRISH FISHERIES.

To the Editor of "Freeman and National Press."

Sir,

CAPTAL readers of Sir Thomas Brady's letter in your issue of the 22nd ult. might be led to believe that it was the moderate statement of a very strong case instead of a most plausible recapitulation of a very weak one. His major proposition, that the turbines do kill the fish, has yet to be established. They may have done—he states that it was proved they did by the report of a Committee which took its evidence almost a generation ago—but an Irishman who bases any legislative proposition on a precedent of thirty years ago can obtain very little credit for either observation or consistency. Any number of "late lamentations" will not hide that fact. One "Fishery Inspector" did assert before the Committee now sitting that he had lifted dead fish from the salience of a mill in this vicinity. These precious specimens, he asserts, no person ever saw but members of his own family. Strange proceedings! Why did he not show them to the owner of the mill at once, and in the presence of witnesses produce incontrovertible evidence that fish were killed, there and then? I think that we may fairly assume that those fish were too "fresh," and had to be eaten *cos grassa salu*. The necessity for this condiment is strengthened by the fact that one of his co-inspectors, in the irritating prosecution which preceded the introduction of the Bill now under discussion, when asked if he could prove the existence at all of a turbine at a certain place, swore, in confirmation, that he heard every beat of the haddock. Rather a phenomenal proceeding when one considers that in the turbine in question the said haddock produce 5,760 "beats" per minute, while the merely human ear is incapable of differentiating between the beats when they exceed 100 per minute!

Sir Thomas says "The result of the labours of that Committee was the passing of the Act of 1863." Amongst its provisions was one directing that where turbines or other injurious hydraulic machines existed the users should provide gratings to prevent the young salmon passing through. The Act of 1863 was certainly subsequent to the labours of that Committee, but it is ancient history now that the clause in question was smuggled in without the cognisance of the Irish millowners.

Now as to Sir Thomas Brady's *admirabilem* appeal on behalf of the Irish fisherman. In this he is no novice. In his letters and speeches, which I have now before me, in the official report of the International Fisheries Exhibition of 1883, this tone is singularly predominant. Indeed it may be said to be the keynote of all his utterances. That he assumes this line of thought and speech is not to be wondered at in view of the statement of the Hon. Spencer Walpole, in vol. i, p. 40, of the report, that "Irish fishermen have been the favourite object of State patronage for years. So long is this patronage continued there will always be a race of Irish fishermen."

He justly says that turbines have increased year by year since then, and I may add that they will doubtlessly continue to do so if unaltered Ireland is to have any industrial future, unless prevented by this meddling legislation, of which Sir Thomas Brady is such an admirable exponent. It is only with turbines that waterpower can be utilized to drive the modern machinery necessary for successful competition. They possess little inertia; they are capable of being governed, and they have an efficiency of 20 per cent. over breast wheels. If this war of extermination which the conservators are waging against them is successful, the manufacturers will be driven to the large seaboard towns. As coal will be cheaper there and the transport of materials will be considerably less, the workers must follow, the country will be depopulated, and that state of things will come which the Prime Minister not half a year ago so lamentably deplored. There will be room for salmon fishing then. Indeed it is quite evident that the conservators are determined to keep the western rivers with their vast water power unemployed, as no sane person would sink capital there under such harassing and precarious conditions. Already their action has begun to tell and in some districts the exodus of manufacturers and their workpeople has commenced. And does the comparative value of the fishing industry justify this? I will again quote from the Exhibition Reports. Fryer on "The Salmon Fisheries," p. 40, says—"The manufacturing and mining industries of the country are of vastly greater value than the salmon fishing industry. The annual value of the exports of British and Irish manufactures and produce is two hundred and fifty millions sterling. The enormous total takes no cognisance of home consumption, and against it the salmon fisheries of the three kingdoms can only show a gross estimated production of three quarters of a million a year." This statement, he it remembered, is by a specialist, and delivered at an Exhibition for the Promotion of Fisheries as late as 1883.

There is one phase of this question to which sufficient attention has not been directed. That is; the patriotic action of the conservators. According to the showing of one of the witnesses that commendable body spend considerably more yearly than they receive. Is this the result of pure philanthropy, as they would wish one to believe, or is it insured to swell the already large dividends of the Bann, Foyle, and Erne Fishery Company, of which he is a partner? By all means let them spend as much money as they have a mind to foster and promote their own industry, but give them no legal right to put other industries under contribution for that purpose. These capitalist companies and landlord owners of royalties, so called, not satisfied with the unjust 1863 laws, which we claim to have repealed, wish to crush turbine wheels, and with them the struggling industries of Ireland, out of existence. They state the fish were here before the mills, but so were the potential water rights, and so were the men and women of Ireland, (indeed, in my own case and in that of the next lower mill-owner, the power formerly belonged to the adjacent Abbey of St. Mary's, and was used by the monks till the dissolution of the monasteries, 300 years ago), and as the land was cleared in the past half century to make Ireland a grazing field to rear stock and beef for England, so the mills and the population dependent on them are to be stamped out and driven off to swell the incomes of these capitalists and owners of monopolies. It has been shown by no less an authority than Dr. Dry that drainage and cultivation by reducing the water between floods in the rivers tend to the destruction of the salmon supply. Why do not these conservators institute a crusade against the farmers and compel them to fill up their drains and turn their land into its original state of bog moor and meadow in order to protect the salmon? But Ireland has few manufacturers, and they are more easily crushed than the farmers. It still seems a most point whether the turbines injure salmon fry or not. Even Sir Thomas does not seem certain on the point. But to me there is no doubt on the matter as far as my two Lifford wheels are concerned. I placed a fish-lattice effectively across the exit of the water at 14 days in April, during which time the water flowed through these meshes, and had no other possible outlet. There were a few living but not one dead fry to be seen, although I searched the turbine pool thoroughly with an incan-

cast electric lamp passed under the water. Other causes not one or two but many, are at work lessening the fish in our manufacturing rivers. And the remedy is apparent, viz., artificial propagation near the rivermouths. Even the Japanese, just emerging from barbarism, have adopted it years ago. In every large salmon river in Scotland it has been in operation for many years. Dr. Day says, with regard to artificial propagation, that "all natural salmon rivers may be kept thoroughly stocked with this fish, and rivers which have been depleted through any cause brought back to their former excellence." And yet to-day in Ireland the only remedy is to blame the millowners. Why can the two industries not live side by side? I have shown that from a comparative standpoint the fisheries are nowhere. If it is merely a question of the survival of the fittest, they must go, as they have gone in England in the past. But can even the less fit survive too? Science has scored another victory here, and the conservators are perfectly well aware that with improved methods the lower reaches of the river and the seaboard may yet yield an abundant and remunerative harvest without at all interfering with the rights of the millowners. We have no wish to see the salmon extirpated, but we contend that from a national standpoint it is of vital importance that we should be unhampered and unrestricted in our race to place on a firm footing the material prosperity of our native land.

Yours truly,
(signed) John Dineen.

Oldgreen Woollen Mills, Ballymean.

I N D E X.

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I N D E X.

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A.

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2. *Case of Mr. Webb.*
3. *Case of Mr. Dinmore.*

1. *As to the Mills generally in the District, the Erection of Gratings at Turbines, and the Condition of the Fisheries:*

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Reference to a visit paid by witness and Mr. Howard to the various mills on the River Bann; complaint that with the exception of Mr. Gilson's mill none of them had efficient fry-guards during the important months of April, May, and June, *Moore* 3815-3833.

Explanation of the real value of the Foyle, Bann, and Erne fisheries, with the poor-law valuation; denial that the Bann fishery is of the greatest value, *ib.* 4026-4028, 4346-4368.

Estimate of witness that there are only 100 miles of the Bann and its tributaries available for salmon breeding; explanation that this distance represents the different mileages of the tributaries of that river that are not stopped by either mill-dams or turbines, *Moore* 4073-4088—Further examination respecting the alleged total destruction of the salmon fishing in the Six Mile water by turbines, &c., *ib.* 4162-4175, 4461-4474.

Reference to the fish pass at Maguire's Bridge; impracticability of constructing such passes on the Bann owing to the difficulty of getting sufficient water, *Moore* 4391-4397.

Denial of statement that the owners of the fisheries at the mouth of the Bann employ tugs to destroy the fishermen's nets, *Moore* 6412, 6413—Conclusion that the agitation against the present existing law in regard to gratings or fry-guards arose out of the action of the millowners on the Bann in resisting the requisitions of the conservators for the erection of proper protective appliances, *ib.* 6451-6457.

Impression that the issue of notices in 1880 about turbines arose chiefly through the decline in the Bann fisheries, *Sir T. Brady* 7359, 7360—Great decline of the fisheries in the River Bann and its tributaries, *Hornsby* 8131-8134.

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Blackbrook Factory (Newry). See *Submerged Trough*.

Blackwater (Cork) Fishery. See *Lisnore District*.

Bodmer, G. B. (Analyst of his Evidence.)—Is a civil engineer and an associate of the Institute of Civil Engineers; has made a special study of turbines, and is the author of a book on the subject, 5505-5509, 5627, 5628.

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Bedmer, G. R. (Analysis of his Evidence.)—continued.

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Testimony to the great value of turbines as compared with the old fashioned water-wheels; coincidence of witness in the estimate given by previous witnesses that the mill-owners gain from 25 to 40 per cent. more power by their employment, 5566, 5568. 5649-5654. 5690-5696.—Reference to the MacAdam turbine in operation at Mr. Gibson's mills; this machine is of the impulse class of turbine and has been in use for the past twenty years, 5567-5571. 5668.—Opinion that the velocity with which smolts must be shot into the turbines would be sufficient to kill them quite apart from the danger they run of being crushed by the machinery when passing through, 5578-5681.

Evidence respecting the experiments made by passing pieces of wood and turnip through turbines; opinion that such experiments are anything but satisfactory, 5620-5623. 5634. 5635. 5669-5672. 5714. 5715.—Statement that turbines require the protection of inclined gratings to prevent them from getting blocked up by pieces of floating debris, 5638-5644.—Opinion that certain fry-guards, upon a plan produced before the Committee as being unworkable, might be erected without materially interfering with the flow of the water or the working of the turbines, 5645-5648. 5677-5790.

*Brady, Sir Thomas. (Analysis of his Evidence.)—*Lengthened experience of witness in the Irish Fisheries Department, which he entered in 1849; he was appointed Inspector of Fisheries in 1860 and occupied that position till the end of last year, 5918-5926.

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Brady, Sir Thomas. (Analysis of his Evidence)—continued.

Explanation of the circumstances connected with the prosecution of Mr. Webb, the difficulties having arisen through local friction; desire shown by the inspectors to settle the matter by exceeding their powers in granting an exemption, 7044-7063. 7350. 7364-7368.

Information as to certain notices issued to the owners of mills and factories by the Fishery Inspectors in 1870 and 1890, respecting the obligations imposed upon them in the matter of gratings and lattices, 7064-7075.—Reference to the reports of the Inspectors for 1870 and 1871, as showing the very considerate manner in which the millers were dealt with as regards the erection of gratings and lattices, exemptions having been very freely granted, 7076-7081.

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Suggested conference between millowners and fishery owners, with the inspectors of fisheries acting as arbitrators; compromise contemplated between the two interests, 7217, 7218. 7387-7400.—Belief that the fisheries can be protected without any injurious interference with the working of the mills, and that there need be no difficulty in reconciling the two interests without resorting to the proposed Bill, 7217, 7218. 7223-7227. 7254-7256. 7262-7266. 7386-7400.—Comment upon the obstructive position taken up by Mr. Webb, whilst his views are not shared by some millowners, 7217-7222. 7255. 7256. 7400.

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Brady, Sir Thomas. (Analysis of his Evidence)—continued.

Explanation that in his recent experiments as to the effect of turbines, witness did not try whether the fry could pass through the gratings, 7276-7289—Statement of witness' grounds for refusing an offer by Mr. Webb to supply nets for the conduct of experiments at his mill, 7329-7342.

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[Second Examination.] Explanation that the bars at Mr. Young's mill are from half to five-eighths of an inch apart, 7401-7403.

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Further approval of the Cork grating as one not injurious to the millers whilst it protects the fry, 7809-7811—Absence of any such vibration in the gratings as to deter the fry from passing through, 7812-7815.

Report by witness and his colleagues adverse to Mr. Macartney's Bill on the ground that it would leave the whole of the fisheries subject to the milling interests, 7816-7818.

Brady, Sir T. Letter from Sir Thomas Brady, dated 10th April, to the "Freeman's Journal and National Press," with reference to the dangers to the salmon fisheries from mills and turbines, and suggesting the remedies required, *App.* 327, 328.

Braide River. See *Phanix Mill*.

Breeding Grounds. Illustration by means of a map of the catchment area and salmon-breeding area of the rivers in Ireland; in the Poyle, Erne and Bann rivers there are now only 650 miles available for that purpose, *Moore* 3720-3731.

Bucket and Breast Wheels. Evidence to the effect that the old bucket and breast water wheels inflict no damage whatever on the fry; increased injury if these were generally displaced by turbines, *McDermott* 1681-1686; *Foley* 5067-5070, 5118-5134, 5149-5154.

Bond, Willie. (Analysis of his Evidence.)—Is a barrister practising at the English Bar, and has for many years been chairman of the Salmon Fisheries Board, 6851, 6852.

Statement as to the practical identity of the present Bill with the Act of 1873, which was drafted by witness, 6852-6855—Evidence as to the damage done to the English salmon fisheries by there being no provision for the erection of guards, &c., by millowners, 6856-6861.

Opinion that the suggestion that the fishery owners should erect the necessary gratings is impracticable, 6863—Belief that a millowner might be able to erect proper safeguards, but it would not be possible to keep them in position for the whole year through, 6864-6868, 6870—Importance of making proper provision for the passage of the smolts down to the sea, 6874, 6907.

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Statement that there are no powers under the existing laws whereby Bond may be taken or entered on with a view of erecting gratings; opinion that this alone would be fatal to the working of Mr. Macartney's Bill, 6908-6913.

Bye-washes (Mills). Belief that the fish can easily pass up and down the river through the bye-wash connected with the mills, *Gault* 954, 955, 9749-975, 1184—Statement that bye-washes would not injure or affect the working of mills and that they might be erected with very little trouble or cost, *McDermott* 1674-1676, 1864.

Bye-washes (Mills)—continued.

Importance of the provision of bye-washes; opinion that no injury to the working power of the mills would accrue from their construction, *Moles* 2250-2256.—Additional information respecting the importance of providing bye-washes and salmon-passes over weirs; details as to the objections of millowners to erect such safeguards, *ib.* 2537-2557. 2579-2585.—Protection to the fry by means of a bye-wash, as at Mr. Webb's mill, *Sir T. Brady* 7230.

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Cable, Cornelius. (Analysis of his Evidence).—Is a mechanical engineer carrying on business at Dublin; has had great experience in water wheels of all descriptions and has erected about 130 turbines in Ireland, 780-784. 886, 887.

Considerable development in the erection of turbines of recent years, 785.—Opinion that if gratings with a fine mesh are required to be erected, the opportunity of using the water power would be totally lost, 786-789. 922.—Conclusion, as the result of careful investigation, that neither the grown fish nor the salmon fry are liable to receive injury from the turbines; facility with which articles of large size pass through these machines, 790-798. 858-869. 881-885.

Reference to the McAdam turbine erected at the Lisnashill Mills; corroboration of Mr. Wilson's evidence as to the special nature of that machine and as to its requiring the protection of a special grating, 799-805. 829-832.—Evidence concerning the great value of the turbine as compared with the ordinary water-wheel, 807-810. 845-849. 921.—Details in explanation of the construction and working of turbines, with illustrations from a model produced, 811-817. 853-857.

Examination upon the assertion that fish have been seen in the mill-races, and that they apparently received no injury, 818-820. 833-838. 870-876.—Statement as to the insufficient number of salmon-badders in the Irish rivers, 822-828.

Suggestions as to the form and construction of efficient gratings for the protection of both the turbines and the fish, 839-844. 887-907.—Statement that in cases where several mills are dependent on the same stream for their water power the erection of the gratings required by the conservators would reduce the power of the lower mill to a minimum, 877-881.—Examination respecting the great expense that would be incurred in erecting the required gratings at Mr. Webb's mills, 908-917.

Canadian (American) Weed. Doubt as to Canadian or American weed being destructive or injurious to salmon, *McDermott* 2037-2041; *Hornaby* 5169.—Evidence in support of contention that Canadian weed is not injurious to the fish, *Moles* 2312-2315. 2564-2570. 2732; *Moore* 3926-3937; *Fairy* 5155-5158. 5278-5281. 5334-5339.

Carre, R. P. (Analysis of his Evidence).—Is a finisher of cotton goods; has two mills in Ireland, one near Belfast, and one near Ballymena, at the latter of which the turbine is used, 1511-1523.

Successful competition of Irish goods with those of Lancashire; statement that the success of the Irish manufactures is due to the employment of water-power and to the low rate of wages paid, 1524-1531. 1541-1548.—Protest against the restrictions in Ireland, which do not exist in England or Scotland, with regard to the employment of turbines; opinion that the carrying out of such restrictions will inflict serious injury on Irish industry, 1532-1537. 1549-1553. 1584-1587.

Evidence respecting the interference with the turbines caused by the erection of gratings, 1539. 1540. 1555-1573. 1577-1589.—Disposition of witness to assist in the protection of the fish, provided he is not called upon to contribute towards the expense or to impair his water-power, 1574-1576.

Castledawson Mill (Derry). Statement as to the injury done to the fish by the neglect of the proprietor of the Castledawson Mill (on a tributary of the Bann) to close his sluices when the machinery is not working, *Hazard* 4658-4660.

Coast Fisheries. Conclusion that the boat-sweepers who carry on their operations round the coast might fairly be called upon to contribute towards the protection of the salmon in the rivers, *Moore* 4194-4209.

Coleraine Fishery District. Information as to the number of mills in the Coleraine district which are worked by water power; estimate that over 9,000 people depend upon the local industry, *Wells* 54-60.—Evidence as to the manufactures carried on at the various mills; estimate that the turn-over value of the goods brought under operation by ten of the largest mills is about 1,300,000 £, *ib.* 61-70.

Admission that the method adopted in catching fish at Coleraine by means of a net spread across the river is liable to prevent the salmon from passing up the stream, *Moore* 4385-4390.

Report, 1890—continued.

Coleraine Fishery District—continued.

Papers submitted by Mr. Moore respecting the election of conservators for the Coleraine district, *App.* 323-325.

Several resolutions entered in the minute book of the Coleraine Fishery Board upon the subject of the erection of gratings and wire lattices at different mills, *App.* 324, 325.

See also *Ballymena District.*

Competition (Millowners and Manufacturers). Successful competition of Irish goods with those of Lancashire; conclusion that the success of the Irish manufactures is mainly due to the employment of water power and to the low rate of wages paid, *Carre* 1514-1531, 1541-1548.

Compromise. Suggested conference between millowners and fishery owners, with the inspectors of fisheries acting as arbitrators; compromise contemplated between the two interests, *Sir T. Brady* 7217, 7218, 7387-7400—See also *Exemptions. Mills and Millowners, 2.*

CONSERVATORS (LOCAL FISHERY BOARDS):

Opinion that such bodies as local fishery conservators should not be possessed of independent powers but should be under the control of the Fisheries Commissioners, *Webb* 101, 106, 110, 111, 114, 115, 278-283, 318, 319—Conclusion that the expense of erecting gratings, &c., should fall upon the conservators, and that the latter should not be allowed to diminish the amount of water power, *ib.* 130, 244, 310.

Objection to the present state of the law whereby millowners are at the discretion of the conservators, *Dismore* 405—Suggestion that the conservators should erect the necessary gratings, &c., at their own expense, *ib.* 505-518—Concurrence in the view that the cost of erection and maintenance of such gratings, &c., as are found to be necessary for the protection of the fish, should fall upon the conservators as being the parties most interested, *Gault* 1031, 1032, 1036-1039, 1042, 1062-1064.

Expression of want of confidence in the conservators as being more in sympathy with the sporting than the commercial element, *Sheldrake* 1411-1416, 1439-1446.

Conclusion that the passing of Mr. Macartney's Bill would ruin the fisheries, as it would leave the conservators even more powerless than they are at present, *McDermott* 1714, 1715, 1781, 1782, 1794-1796, 1800-1808, 2008, 2051-2054.

Objection to Mr. Macartney's Bill on the ground that it would throw the burden of preserving the fish from injury upon the conservators, who are without the necessary funds; opinion that this expense should be borne by the millowners, *Petre* 3316-3324, 3431-3441, 3460-3471, 3496-3505.

Inadequacy of the funds at the disposal of the conservators to cope with existing requirements; details given of their receipts and payments in witness' district, (*Sligo*), *Coper* 3585-3601, 3607-3670, 3697-3710.

Information respecting the appointment of the conservators of the Ballyshannon and other districts, there being three classes, viz., riparian owners, owners of fisheries valued at 100 £ per annum, and those who are elected by the fishermen and anglers, *Moore* 3713-3719—Evidence as to the impracticability, owing to want of funds, of the proposition in Mr. Macartney's Bill for throwing the expense of protecting turbines on the shoulders of the conservators; details given showing that their expenditure is largely in excess of their income, which has to be supplemented by subscriptions from the lessees of fisheries, *ib.* 3743-3790, 3882, 3959, 3960—Absence of any desire on the part of the conservators or the fishery owners to inconvenience the millowners, *ib.* 4448-4450.

Concurrence in the objection to Mr. Macartney's Bill on the ground that it would make the fishery owners pay the cost of the necessary protections to turbines, &c.; opinion that the conservators would not be able to carry out the burden proposed to be put upon them, *Foley* 5106-5116, 5179, 5238-5246.

Statement of objections to Mr. Macartney's Bill on various grounds, the chief being the unfairness of shifting the responsibility and expense for providing proper protection for the fish from the millowners to the conservators; assertion that the latter body have no funds wherewith to undertake such work, *Paterson* 6192, 6193, 6196, 6200-6209.

Duty of the boards of conservators, not of the inspectors, to enforce the turbine clause; comment upon their omission in the matter, *Sir T. Brady* 7361-7385.

Conclusion that the expense of gratings, &c., should be borne by the millars, the conservators being unable to defray the cost, *Hornaby* 8019-8032, 8179-8184, 8190-8197.

Papers submitted by Mr. Moore respecting the election of conservators for the Coleraine district and the forms to be observed, *App.* 324, 325.

See also *Acts of Parliament. Ballymena District. Bann River. Fishery Owners. Gratings, Fry Guards, &c. Mills and Millowners. Turbines.*

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Cooliney

Coolloney (Sligo). See *Balisodare River*.

Cooper, Edward Henry (Analysis of his evidence).—Ownership by witnesses of a "several" salmon fishery in the Balisodare River, in the Sligo district; he employs from forty to fifty men in the fishery, 3518-3523-3549-3551.

Information respecting some turbines that have been erected at Coolloney, and the steps taken for rendering them harmless, 3527 *et seq.*—Reference to the erection of fry-guards on the requisition of witness, and to his action in defraying their cost; amicable relations existing between the millers and witness, 3531-3533-3555-3573-3574-3577—Examination respecting the nature of the guards; since their erection there has been no injury to the fish and no complaints have been received as to stoppage of water power or difficulty in keeping such protections free from obstruction, 3532-3545-3557-3573.

Opinion that turbines unprotected inflict great injuries on the fish; if suitable guards had not been erected the fishery of witness would have been destroyed, 3552-3554-3581—Equity of making the millowners bear the cost of protecting the fish, 3575-3578—Friction that would probably arise if the burden of protecting the fish were removed from the millowner to the fishery proprietor, 3579, 3579.

Objection to Mr. Macartney's bill as being subversive of existing rights; witness would not have given his tenants so many privileges had he known that such a Bill was proposed, 3571-3578, 3595-3599, 3672-3694—Inadequacy of the funds at the disposal of the conservators to cope with existing requirements; details given of their receipts and payments in witness' district, 3576-3601, 3607-3670, 3697-3710.

CORK WATERWORKS (RIVER LEE):

Reference to the Cork Waterworks and to the efficiency of the protection to the turbines; explanation that lattices were tried and found to be impracticable, and were therefore replaced by vertical iron bars, *Foley* 5042-5048, 5071-5079, 5304-5312.

Statement that there are two turbines of the MacAdam type and two on the Fourcroyon system in operation at the Cork Waterworks; details in explanation of the working of these machines, *O'Toole* 5842-5854—Description illustrated by the production of specimen of the fry guards recently erected; lattices were tried for many years, but owing to the difficulty of keeping them clean they were replaced by the present protections, which are eminently satisfactory, *ib.* 5855-5870, 5879, 5880-5885-5888, 5890, 5891, 5901-5911, 5952-5958, 6107, 6108.

Belief that the original guards at the waterworks were erected on account of the great damage inflicted on the salmon fry by the working of the turbines, *O'Toole* 5881-5884, 5918-5928, 5944, 5945-5949-5951, 6109-6115—Information respecting the provision of duplicate and spare guards in case those in ordinary use are rendered useless for a time; these duplicates can be readily fixed up, *ib.* 5895-5897—Estimate that the fry guards under discussion would cost about 200 £, *ib.* 5912-5917, 6101-6105.

Further information respecting the guards which were invented and placed in position at the Cork Waterworks by witness, *O'Toole* 5884-6107.

Witness disagrees with the evidence as to the guards at the Cork waterworks not interfering with the water power; detailed scientific evidence in support of the views expressed by witness to a contrary effect, *Ferry* 5781-6816—Improvement by the use of the grating, as erected in the River Lee at Cork; obstruction however in this case as regards the water power, *Sir G. T. Pollard* 7582-7585, 7593-7598.

Very successful operation of a grating invented by M. O'Toole and erected at the Cork Waterworks; great trouble caused by the lattice previously in operation, *Sir T. Brady* 6956-6963, 7023—Further approval of the Cork grating as one not injurious to the millers, whilst it protects the fry, *ib.* 7809-7811.

Advantage generally of a grating as used at Cork, as, if kept properly clean, it would not interfere with the working of the turbines; considerable difficulty however in keeping it clean, *Wilson* 7891-7906—Approval of the Cork grating as easy to erect and easy to clean, *Hornby* 8185.

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Dams. See *Weirs and Dams*.

Dunmore, John, Junr. (Analysis of his Evidence).—Is manager of the Old Green Woollen Mills, Ballymurn; was, for two years, at the Yorkshire College of Technical Education at Leeds, 370-373.

Statement

Dinsmore, John, Junr. (Analysis of his Evidence)—continued.

Statement that two turbines of about forty-five horse power each are in operation at the above mills, and that employment is given to 110 people, 374-376.—Reference to the prosecution of witness, presumably by Mr. Edward Moles in October 1889, for non-compliance with certain requisitions of the board of conservators, 377-379.—Explanation that gratings and lattices were erected, but the difficulty of keeping them free from obstruction practically rendered the working of the mill an impossibility, which fact was recognised by Sir Thomas Brady, who granted witness an exemption, 380-381, 402-404, 454-485-494, 522, 523.

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Employment (Fisheries). Grounds for the estimate that about 1,000 people are employed in the salmon fisheries in the Foyle and adjacent districts, *McDermott* 1651-1656, 1834-1839, 2026-2027.—Opinion that the absence of gratings or fry guards at turbines would inflict a serious blow on an important Irish industry; particulars of the number of people who depend upon the fisheries for their livelihood, *Petrie* 3682-3687, 3324-3336, 3442-3460, 3307-3512.

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2. *Experiments by Mr. McDermott and others.*
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1. *Experiments*

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EXPERIMENTS (TURBINES)—continued.

1. *Experiments by Mr. Robinson upon the Question of Fish being injured in passing through the Turbine Wheels:*

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X x

Necessity

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Faughan River. Evidence as to the injuries inflicted on fish and the number of salmon killed by the machinery of certain mills on the River Faughan, a tributary of the Foyle; inability of witness to give a percentage of such losses, *McDermott* 1667-1673. 1742, 1743. 1867-1887. 1941-1955. 2055-2087.

Fenaghy Mill (Ballymena District). Reference to the grating which is kept up permanently at a mill at Fenaghy, belonging to Mr. Young; assertion that the working of the mill is not affected by this grating, which is very easily cleaned, *Moles* 2109-2112. 2294-2305.

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FISH-PASSES (SALMON-LADDERS):

Evidence as to the non-erection of salmon-ladders, &c., by the Conservators, because the execution of such works would have to be defrayed out of their own funds, *Webb* 116-120.—Statement as to the insufficient number of salmon-ladders in the Irish rivers, *Coffe* 822-824.—Reference to the objection of millowners to the erection of fish-passes, *McDermott* 1734-1737.

Statement as to the non-existence of any salmon-ladders on the twenty-five weirs in the district inspected by witness, *Moles* 2098-2101.—Utility of fish-ladders; the Conservators have no power to enforce their erection, *Moore* 3305-3325.—Conclusion that the scarcity of fish-passes may be attributed to the inability of the Conservators to enforce

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Flax Water. Admission that the presence of flax-water in the rivers is fatal to fish, *Webb* 40-43.—Great injury done to the fish by the presence of flax-water in the rivers, *McDermott* 1903, 1907-1910, 1959.

Opinion that flax-water is not so destructive to the fish as is represented to be; reference hereon to experiments made by witness, who found that water, one half of which is flax-water, is not injurious to the salmon, *Moore* 4087-4099.

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Foley, Richard. (Analysis of his Evidence).—Is a civil engineer of twenty-eight years' standing; has had considerable experience in hydraulic works, and has erected turbines and other water-wheels, 5013-5016.—He is lessee of the Blackwater General Fishery, has established a salmon hatchery, and is a millowner, 5017-5020.

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Foley, Richard. (Analysis of his Evidence)—continued.

Further evidence respecting the working of turbines, and the water-power necessary for them; opinion that properly constructed gratings would not affect the water-power to any extent, 5095-5105, 5217-5227, 5259-5277—Objection of witness to Mr. Macartney's Bill, on the ground that it would make the fishermen pay the cost of the necessary protections to turbines, &c.; opinion that the Conservators would not be able to carry out the burden proposed to be put upon them, 5106-5115, 5179, 5238-5246—Statement that efficient guards of the nature described by witness might be provided at a moderate cost, and without injuring the water supply of the mills, 5115, 5117.

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Food Supply. Importance of the protection and development of the fisheries on the score of the food supply, *Sir T. Brady* 7253.

Foyle, Bann, and Erne Fisheries. Explanations as to the mode of appointment of the Conservators of these fisheries, there being three classes, *Moore* 3713-3719—Information respecting the catchment area of the Foyle, Bann, and Erne, there being now only 550 miles in the three rivers available for breeding; much greater length of breeding time before the operation of turbines, *ib.* 3720-3742.

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Reference to an assertion made by the inspectors of Irish fisheries in their Report respecting the non-payment of the 10 per cent. charge; denial that this refers to the fisheries in which witness is interested, *Moore* 4044-4051, 4052-4058—Statement that in the knowledge of witness no action has ever been taken to find out the defaulting parties, or to enforce the due payment of this percentage, *ib.* 4059-4072.

Reference to the visit paid by witness in conjunction with Mr. Moore to the various mills and manufactories in the Foyle and Bann fishery districts; of the mills visited fully half employed turbines as their motive power, *Hazard* 4543-4553—Operation of fourteen turbines at the various mills visited by witness in conjunction with Mr. Moore; statement handed in of the number and class of motors used at these mills, *ib.* 4553.

Opinion that the deterioration in the Foyle fisheries is not due to any increase in poaching; witness denies that poaching cases have increased, as that there have been more convictions for discharging flax-water into the rivers, *Munn* 6437-6445, 6550.

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FRY AND SMOLTS:

Evidence in support of conclusion that salmon fry, as being very delicately constituted, must necessarily be injured in passing through turbines; specimens of fry produced to the Committee, *McDermott* 1753, 1763-1790, 1845-1849, 1922-1928, 2009-2011, 2217—Opinion that salmon fry in descending to the sea do not turn aside to avoid any obstruction or danger whatever, *Moore* 2163-2168—Examination respecting the difference between smoults and salmon fry, the former being small fish that have already descended to the sea, *Hazard* 4792-4795, 4991-5005; *Munn* 6447-6450.

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Much greater importance of preventing the fry from entering the turbines than of protecting the spent fish by means of gratings, *Sir T. Brady* 7231-7233—Several respects in which it is more important to protect the smolts than the gravid fish; question herein as to mill-race gratings being essential generally, *Hornby* 8033-8037. 8144-8149.

See also *Experiments. Gratings, Fry Guards, &c. Turbines.*

Gault, Maxwell. (Analysis of his Evidence.)—Is port owner of the Phoenix weaving manufactory, on the River Braide, where employment is given to about 150 hands, and one turbine is used, 923-927.

Reference to the prosecution of witness in 1884 and to his being required to erect certain gratings and nettings, 928-933—Evidence as to the impossibility of complying with such requisitions; statement in regard to Mr. Hornby's recognition of this fact, and to the exemption granted by him, 934-949. 985-992. 1010. 1011. 1031-1035—Great importance of turbines in connection with the industries of Ireland, 950-952.

Assertion that no injury to fish through the employment of such machines has ever come under the observation of witness, 953. 993. 994. 1004. 1065—Opinion that fish although frequently found in the mill-races, do not pass through the turbines, 954. 955. 1008. 1009—Belief that the fish can easily pass up and down the river through the bye-wash connected with the mill, 955. 974-976. 984—Diminution in the number of salmon attributed to the improved system of drainage, 956-957. 1038.

Opinion that owing to the sluggish nature of the mill-race at the Phoenix works, the salmon would be in no danger of receiving injury, even if there were no bye-wash, 983—Unqualified objection to the erection of any form of grating at the foot of the tail-race of the above mill, 996-1000—Difficulty of keeping clean such gratings as are now in use, 1005-1007—Desire of witness for the passing of the Bill brought in by Mr. Macartney, 1012-1016—Objection to the entrustment of the interests of the various millowners to the fisheries' inspectors; opinion that disputed points should be referred to arbitration, 1017-1020.

Statement that the cost of erection and maintenance of such gratings, &c., as are found to be necessary for the protection of the fish should fall upon the conservators as being the parties most interested, 1021. 1022. 1026-1029. 1042. 1062-1064—Inability of witness to recognize the vested rights of the fishery owners as being superior to those of the millowners, 1023-1026. 1036. 1037. 1046-1052. 1058-1064—Opinion that there is very little poaching of fish in the district, 1039-1041.

Glen, William. (Analysis of his Evidence.)—Is engaged in the bleaching, dyeing, and finishing business at Lisnaffillan, on the River Main; employs about 200 hands, and has a turbine of the McAdam type in operation at his works, 1070-1075.

Report, 1892—continued.

Gibson, William. (Analysis of his Evidence)—continued.

Information respecting the disadvantages of the McAdam turbine, owing to its shield being so liable to get fouled; intention of witness to erect another machine, but of a different make, 1076-1082. 1097-1100. 1107-1126—Importance and value of the turbine in connection with any trade or business dependent upon water-power, 1083-1086. 1091—Statement that witness has never discovered that any injury has been done to the fish by these machines, 1087. 1103-1106. 1183.

Circumstances under which Sir Thomas Brady granted witness an exemption from erecting protective iron bars at the head mill-race, 1088. 1101. 1102. 1145-1154. 1174-1179—Dissatisfaction with the state of the existing law, 1089. 1090—Opinion that the shield of the McAdam turbine would effectually stop fish from going down the mill-race, 1092. 1093—Statement of the damage done to the machinery through the variation in the water-power caused by the erection of certain gratings, 1094-1096. 1155-1162.

Objection of witness to contribute anything towards the erection of any gratings that might affect his water-power, 1127-1135—Conclusion that the interests of the fishery owners are not of so great importance as those of the millowners, 1136. 1137. 1190.

Galwey Fisheries. Information in detail as to the great amount of damage to the fishing by the mills in Galwey; statement that this damage is caused by the actual killing and maiming of the fish by machinery, by poisoning, and by the obstruction of the rivers by mill-dams, &c., *Hallett* 2850-2870. 2894. 2895. 3070. 3071. 3075. 3076.

Assertion that the fishery interest is of far more importance in Galwey than the mill-industries, and that millowners should not be allowed to ruin the interest for their own benefit, *Hallett* 2900-2908. 2914. 3076-3105—Opinion that the decrease in the number of salmon in the Galwey river may be attributed to the pollution of the water rather than to over-breeding, *ib.* 2980-2984. 3003-3005.

Reference to the gratings erected at the mills in Galwey; witness challenges anyone to prove that their erection has in any way interfered with the effective working of the machinery, *Hallett* 3003-3004.

Immense injury in Galwey if the existing powers of the Fishery Commissioners were strictly enforced, *Perry* 6629-6634—Amicable relations existing between witness and the lessee of the Galwey Fishery; explanation as to the latter making provision for the protection of the fish by erecting a guard at the intake of the works, *ib.* 6632. 6730-6772—Enormous number of salmon which go up the Galwey river for spawning; great importance of the grating clause, and of proper fish passes in such cases, *Sir T. Brady* 6998-7001. 7016—Opinion that an effective fry-guard would not interfere with Mr. Perry's water-power at Galwey, *Horwath* 8213-8218.

GRATINGS, FRY GUARDS, &c. (TURBINES):

1. Evidence on the part of Millowners strongly adverse to the Compulsory Erection of Gratings, Lattices, &c., in front of Turbine Wheels.
2. Evidence as to the necessity of Gratings, &c., in the Interests of the Fisheries.
3. Suggestions as to the kind of Grating or Fry Guard to be employed.
4. Short period of the Year for which necessary.
5. Generally as to the Law and Practice on the Subject.
6. New Clauses added to the Bill as regards Gratings.

1. Evidence on the part of Millowners strongly adverse to the Compulsory Erection of Gratings, Lattices, &c., in front of Turbine Wheels:

Explanation that the objections of witness refer solely to gratings and nettings, on account of the difficulty of keeping them clean and the loss of water-power, *Webb* 248-257. 287-291. 311. 312—Assertion that the erection of nettings and gratings at the extremities of the mill-races would, by affecting the flow of the water, render the working of the mills an impossibility, and would be the ruin not only of witness but of the whole Coleraine district dependent upon the industry, *ib.* 79-91. 94-100. 192-193. 219. 220. 245. 313-316.

Evidence respecting the inconvenience of having lattices, gratings, or nettings in front of the turbines; details as to the stoppage of work caused by the presence of such structures, *Dinmore* 380-384. 402-404. 435-437. 448-494. 522. 523.

Opinion that the erection of gratings, &c., of the nature required would practically annihilate the effective working of the mills, *Wilson* 601-607—Evidence in detail as to the great difficulty and expense of keeping the gratings clear from obstruction, *ib.* 713-736.

Conclusion that in cases where several mills are dependent on the same stream for their water-power the erection of the gratings required by the Conservators would reduce the power of the lower mill to a minimum, *Cadle* 877-881.

Explanation

Report, 1892—continued.

GRATINGS, FRY GUARDS, &c. (TURBINES)—continued.

1. Evidence on the part of Millowners &c.—continued.

Explanation that certain wire nettings, erected in compliance with requisitions received by witness, were taken down on its being found that their presence rendered the working of the mill an impossibility, *Robinson* 1213, 1214, 1219-1221, 1252-1257, 1268.—Difficulty of keeping the mill-races clear from obstruction; reference hereon to the gratings placed in front of the turbines for that purpose, *ib.* 1249, 1250, 1313-1317, 1356-1377.—Objection of witness to the erection of perforated iron plate as guards to the turbines; opinion that such shields would seriously interfere with the water power, *ib.* 1310-1312.

Alarm with which the possible enforcement of the erection of gratings, &c., is viewed by millowners generally, on account of the injury to business that would ensue, *Shackleton* 1397-1401, 1478.—Opinion that any grating devised with the idea of keeping the salmon fry out of the turbines would interfere with the water power, *ib.* 1467, 1468.—Concurrence in the view as to the interference with turbines caused by the erection of gratings, *Carst* 1539, 1540, 1565-1573, 1577-1583.

2. Evidence as to the necessity of Gratings, &c., in the Interests of the Fisheries:

Concurrence of evidence as to the injurious effects of turbines if unprotected by gratings, *McDermott* 1677-1680, 1686 *et seq.*; *Moles* 2125 *et seq.*; *Petrie* 3311-3315, 3367-3390; *Cosper* 3652-3654, 3582; *Foley* 5051-5070, 5118-5134, 5149-5154; *McDonnell* 5397-5417; *Badner* 5523 *et seq.*; *Moore* 5801, 5802, 5816, 5817; *O'Toole* 5929-5939, 6044-6046.

Details as to the trifling expense necessary to provide sufficient gratings or fry-guards, and of the facility, if the inspectors' directions be observed, with which such guards may be kept clear, *Moles* 2245-2259.—Opinion that the millowners would have very little trouble in keeping the fry guards clear during the few months in the year that their erection is requisite; disagreement with Mr. Wilson's evidence on this point, *ib.* 2306-2312, 2763-2755.

Conclusion that there is nothing antagonistic between the salmon and the mill industries, and that fry guards might be easily devised which would provide the protection required, *Moore* 3851-3859, 3961-3963.—Opinion that fry guards might easily be devised which, while effectually protecting the fish, would in no way interfere with the water power of the mills, *ib.* 4445-4447.

Belief that suitable palings at the head and tail races of mills offer no obstruction to the passage of the water; inability of witness to understand the millowners' objection to such protection, *Hassard* 4663-4667.—Opinion that the obstruction in the flow of water occasioned by the erection of lattices might be obviated by putting them up at more favourable places, and by widening the intake of water, *ib.* 4924-4931.

Conclusion that the nature of the necessary guards depends, to a great extent, on the construction of the various mills and mill-races; belief that in some cases vertical bars afford the best protection, while in others the submerged trough recommended by Mr. Hassard would answer reasonable requirements, *Foley* 5081-5084, 5096-5105, 5159-5177.—Opinion that many of the gratings now in use might, with but little alteration, be rendered perfectly efficient, and could be easily kept clean, *ib.* 5085-5088.

Unqualified objection of witness to Mr. Macartney's Bill on the grounds that it would, if passed, have the effect of repealing the whole of the existing laws with regard to gratings and lattices, would annihilate the fisheries of Ireland, and would confiscate existing fishing rights; details in support of the above objections, and reference hereon to Mr. Willis Band's book on the English salmon fisheries, *Munn* 6353-6384.

Necessity of gratings at head and tail-races of mills, in addition to fish passes, *Sir T. Brady* 7020, 7025, 7027.—Opinion that the repeal of the grating clause of the Act of 1869, as proposed by Mr. Macartney's Bill, would be most injurious to the fisheries, as it would entail an enormous destruction of spawning fish by allowing turbines to be put up indiscriminately without any protection, *ib.* 7082, 7083, 7089-7092, 7211-7217, 7227.—Complaint by millers chiefly as to the cleaning of the gratings, *Horasky* 8021.

3. Suggestions as to the kind of Grating or Fry Guard to be employed:

Opinion that the only practicable form of grating suitable for the protection of the turbine wheels would be one in shape resembling a comb, *Wilson* 706-709.—Suggestions as to the form and construction of efficient gratings for the protection of both the turbines and the fish, *Cadle* 786-789, 839-844, 887-907.—If gratings with a fine mesh are required to be erected the opportunity of using the water power would be totally lost, *ib.* 786-789, 922.

Information with reference to the grating placed by witness in front of the turbine in order to intercept floating debris, *Shackleton* 1429-1438, 1447-1450, 1491-1498.—Details concerning the construction and working of a screen or grating erected on Sir

*GRATINGS, FRY GUARDS, &c. (TURBINES)—continued.*3. *Suggestions as to the kind of Grating or Fry Guard to be employed—continued.*

James Muirland's estate in Scotland; opinion that a guard of this description would be most effective in preventing salmon fry from passing into the turbines, *McDermott* 1775-1780, 1853-1857, 3024.

Statement that the ordinary gratings which are erected for the protection of the turbines from floating debris are quite useless as regards preventing salmon fry from passing into the machinery, *Moles* 2117-2120.—Description of a grating which, in the opinion of witness, would answer all requirements, at a moderate cost; such gratings are erected at the works of Messrs. Genghoun, Maclean, and Black, *ib.* 2273-2281, 2285-2290.—Efficiency of the perforated fry-guard erected at Mr. Genghoun's mills; opinion that this grating does not diminish the water power, *ib.* 2606-2613, 2658-2672.

Statement that provided efficient gratings were erected by millowners there would be no desire or attempt on the part of the fish owners to prescribe any particular kind, *Hailett* 2992-2997, 3089-3092.

Opinion that any fry-guard with a mesh larger than three-eighths of an inch would be useless as a protection to the salmon fry; necessity for the erection of sufficient fry-guards, *Moore* 4247-4263.—Conclusion that it would be useless to prescribe any particular form of grating or fry-guard which should be used universally; the nature of such guards should vary according to the particular circumstances of the case, *ib.* 4457, 4468, 4475-4477.

Belief that fry-guards with apertures of five-eighths of an inch would afford ample protection for salmon fry, *Howard* 4580-4583.—Evidence in explanation of the working of the fry-guards and of the other protective appliances recommended by witness; assertion that such safeguards might easily be kept clear from obstruction, *ib.* 4738-4743, 4745, 4746, 4783-4790, 4796, 4797.—Opinion that falling the submerged trough recommended by witness other guards of a fairly efficient nature might be put up at a small cost; preference of witness for a grating consisting of vertical bars, *ib.* 4806-4819, 4850, 4851, 4868, 4913-4916, 4956-4960.

Statement that efficient guards of the nature described by witness might be provided at a moderate cost without injuring the water supply of the mills, *Foley* 5116, 5117.—Opinion that a guard similar in that erected at Mr. Pritchard's mills on the Bann would be sufficient protection, *McDonnell* 5419-5445.—Statement that a guard of this description could easily be kept clean and would not interfere with the water power of the mill, *ib.* 5446-5452.

Conclusion that turbines require the protection of inclined gratings to prevent them from getting blocked up by pieces of floating debris, *Boomer* 5535-5544.—Opinion that certain fry-guards upon a plan produced before the Committee might be erected without materially interfering with the flow of water or the working of the turbines, *ib.* 5645-5648, 5727-5729.

Conclusion that the proper position of gratings would be at the intakes of the mills, *Moore* 5823-5828.—Belief that a millowner might be able to erect proper safeguards, but it would not be possible to keep them in position for the whole year through, *Band* 6864-6868, 6870.

Opinion that five-eighths of an inch should be the maximum for a grating; advantage of gratings of from three-eighths to five-eighths of an inch, as at Fenaghy mill, *Sir T. Brady* 7191-7197, 7234-7247.

Evidence to the effect that if gratings were erected with half or five-eighths of an inch between the bars the fish would be sufficiently protected and the mill power would not be injured, *Horvath* 8017-8028, 8048, 8049, 8141-8143, 8150-8156, 8185.

Suggestions as to the best description of grating or fry-guard, and the place for its erection, it being important that the cost should fall on the millowners rather than the fishery owners, *Horvath* 8148-8156, 8172-8184, 8190-8197, 8219-8221.

4. *Short period of the Year for which necessary:*

Statement as to gratings being necessary for only five months of the year, *Moles* 2282-2285.—Necessity for fry-guards only in the months of April, May, and June, *Petrie* 3279-3291, 3344-3348, 3418; *Moore* 3858, 3859.

Concurrence in the view that fry-guards are really necessary only during three months of the year, *Foley* 5089.—Need of guards for only about two months in the year, *O'Toole* 5892-5894, 5959.

5. *Generally as to the Law and Practice on the Subject:*

Evidence in detail concerning the difficulties of enforcing the erection of gratings, &c., *McDermott* 1892-1901, 1964-1969, 1971-1976, 1982-1993, 2012-2016.

References to explanation of the various legislative enactments under which millowners have always been obliged to erect gratings, &c., for the protection of the salmon, subject to

*GRATINGS, FRY GUARDS, &c. (TURBINES)—continued.*5. *Generally as to the Law and Practice on the Subject—continued.*

to the provision that such safeguards did no injury to the machinery; details as to the previous discussions, reports, and evidence on this subject, *Hallett* 279^a, 2799, 2822-2842, 2856, 2897, 2904, 2950-2958, 2971-2979, 3106-3179.

Explanation that the power of deciding whether damage has been done to the effectiveness of the mill-machinery by the erection of gratings, &c., was left to the inspectors of fisheries, whose decisions were subject to appeal, *Hallett* 2800-2811.—Statement that no specific kinds of protective construction were laid down by the "gratings clauses" of the Acts to which reference has been made, and that in the opinion of witness lattices of a certain kind are necessary for the protection of salmon fly, *ib.* 2820, 2821, 2998-3000.

Statement that there are no powers under the existing laws whereby land may be taken or entered on with a view of erecting gratings; opinion that this alone would be fatal to the working of Mr. Macartney's Bill, *Bound* 5601-5613.

Explanations respecting the law and practice in the matter of lattices and gratings at the head race and tail race respectively; desire shown by the inspectors not to cause trouble to the millowner, *Sir T. Brady* 6945-6970.—Desire that any hardships are imposed upon millers by the grating clause in the Act of 1869, their difficulties being mainly due to their own omission to keep the gatings clean, *ib.* 6981-6993.

Information as to certain notices issued to the owners of mills and factories by the fishery inspectors in 1870 and 1890 respecting the obligations imposed upon them in the matter of gratings and lattices, *Sir T. Brady* 7064-7075.—Opinion that there has never been any stringent application of the grating clause, *ib.* 7340.

6. *New Clauses added to the Bill as regards Gratings:*

New clause added to the Bill empowering local Boards to place gratings at mouths of streams, *Rep.* viii.

New clauses added to the Bill as regards gratings in water-courses of mills, &c., worked by turbines, and of mills not worked by turbines, *Rep.* viii.

See also *Acts of Parliament. Bolinchar River. Ballymena District. Bann River. Conservators. Cork Waterworks. Exemption. Experiments. Fenaghy Mill. Fishery Owners. Fry and Sawmills. Main River. Mills and Millowners. Phoenix Mill. Sligo Mills. Submerged Trough. Turbines.*

Greenfield Bleaching and Dyeing Works. Evidence as to the magnitude of these works (which are on the Killewater River) and of others in the same neighbourhood; amount of wages paid, considerable employment being given, *Arthur* 545-550.—Information respecting the prosecution of witness' firm and the stoppage of the working of the mills through the erection of lattices, &c., *ib.* 559-569.

Assertion that if the compliance with the requirements of the conservators were rendered compulsory the business carried on by witness and other local mill-owners would be totally ruined, *Arthur* 576, 587, 593, 594.

Opinion that the blocking up of the netting produced before the Committee by Messrs. Arthur is a very special case and due to exceptional causes, *Moles* 2237-2244.

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Hallett, T. G. Palmer. (Analysis of his Evidence.)—Is a Barrister and Justice of the Peace, of Clarendon Lodge, Bath, and of the Fishery, Galway; was formerly High Sheriff of the town and county of Galway, and was a member of the Boards of Conservators of Fisheries in Galway and Somerset, 2783-2785, 2850.

Evidence as to the importance attached by witness to Section 30 of the Act 26 and 27 Vic. c. 114, which Mr. Macartney's Bill, if passed, would repeal; contention that as, under this clause, the onus of proving that damage is done by turbines to salmon, or the young of salmon, lies on the Conservators, there is no necessity to repeal the clause, 2786-2794.—General objections to Mr. Macartney's Bill, witness submitting that should it become law the Conservators will not only be deprived of what little remedy they at present possess against the millowners, but would be put to great expense by having to defray the costs of protecting the fish; opinion that this would be a retrograde step in Irish legislation, and would be productive of immense injury to the fishing interest, as millowners would be practically free to inflict any amount of damage to the fish, 2795-2797, 2818, 2819, 2843-2849, 2858, 2869, 2913-2926, 3040-3063, 3227-3229.

Reference to and explanation of the various legislative enactments under which mill-owners have always been obliged to erect gratings, &c., for the protection of the salmon, 0.80, Y v subject

Hallett, T. G. Palmer. (Analysis of his Evidence.)—continued.

subject to the provision that such safeguards did no injury to the machinery; details as to the previous discussions, reports, and evidence, on this subject, 2798, 2799, 2822-2842, 2856, 2897, 2914, 2960-2968, 2971-2979, 3105-3179.—Explanation that the power of deciding whether damage has been done to the effectiveness of the mill machinery by the erection of gratings, &c., was left to the inspectors of fisheries, whose decisions were subject to appeal, 2800-2811.

Opinion that millowners never experienced any great difficulty in obtaining exemption from the erection of gratings, &c., 2812-2815.—Statement that no specific kinds of protective construction were laid down by the "gratings clauses" of the Acts to which reference has been made, and that in the opinion of witness lattices of a certain kind are not necessary for the protection of salmon fry, 2820, 2821, 2998-3000.

Information in detail as to the great amount of damage to the fishing by the mills in Galway; damage caused, not only by the actual killing and maiming of the fish by machinery, but by poisoning, and by the obstruction of the rivers by mill-dams, &c., 2850-2870, 2894, 2895, 3070, 3071, 3076, 3076.—Evidence respecting the poisoning done by persons connected with the mills; statement as to the difficulty of its prevention, and the great cost attendant on the Conservators' efforts to check this practice, 2871-2890, 3072, 3077-3087.

Assertion that the fishery interest is of far more importance in Galway than the mill industries, and that millowners should not be allowed to ruin this interest for their own benefit, 2900-2908, 2914, 3076-3105.—Recognition by witness of exemptions as being in the nature of compromises between the respective interests of the millowners and the fishery owners; opinion that these interests are not necessarily antagonistic, and might easily be reconciled, 2909-2912, 2969, 2970.

Details in support of objections raised by witness to Irish legislation being attendant on English enactments; statement hereon that the superiority of the Irish fishing is due, in a great measure, to the fact that the Irish fishery laws have always been in advance of those of England and Scotland, 2922-2940, 2944-2950, 2957-2959, 3037-3039, 3064-3069, 3195-3201.—Denial that Irish manufacturers are in any worse position than those of England or Scotland in regard to what may be termed preferential duty, 2941-2943, 2951-2956.

Opinion that the decrease in the number of salmon in the Galway river may be attributed to the pollution of the water, rather than to over-breeding, 2980-2984, 3003-3005.—Statement that, provided efficient gratings were erected by millowners, there would be no desire or attempt on the part of the fishowners to prescribe any particular kind, 2992-2997, 3089-3092.

Evidence respecting the great improvement that has taken place in the Irish fisheries, with particulars of the value of the salmon exports, 3009, 3202-3226.—Reference to the gratings erected at the mills in Galway; witness challenges anyone to prove that their erection has in any way interfered with the effective working of the machinery, 3023-3031.

*Hazard, Richard. (Analysis of his Evidence.)—*Is a civil engineer of large experience in hydraulic engineering; has some knowledge of the habits of migratory fish, 4507-4511.

Detailed description, illustrated by models and drawings, of the various kinds of turbines, and their working, 4512-4526.—Reference to the turbine at Mr. Dinmore's mills; estimate that the fish would be projected into this machine at the rate of forty feet per second, 4527-4536.—Opinion that a fish in passing through such a turbine must inevitably receive injuries of a serious nature, 4537-4542, 4654.

Reference to the visit paid by witness in conjunction with Mr. Moore to the various mills and manufactories in the Foyle and Barn fishery districts; statement that of the mills visited fully half employed turbines as their motive power, 4543-4553.—Evidence as to the worthlessness of the experiments made by Mr. Robinson in passing pieces of wood and turnip through a turbine, 4567-4567.

Grounds for the opinion that the most efficient means of protecting turbines without interfering with the effective working of the mills would be by drawing water from the mill-race by a submarine trough; sketch produced by witness of such a trough in use at the Beambrook factory, near Newry, 4570-4579, 4691, 4696, 4596, 4600, 4601, 4603-4610, 4616-4623.—Belief that fry-guards with apertures of five-eighths of an inch would afford ample protection for salmon fry, 4580-4583.

[Second Examination.] Operation of fourteen turbines at the various mills visited by witness in conjunction with Mr. Moore; statement handed in of the number and class of motors used at these mills, 4633.—Further reference to the submerged trough recommended by witness as the best fry guard; the objections raised by Mr. Webb to such guards as being likely to get blocked up must be founded on a misconception, 4634-4642.

Information respecting the supply of water necessary for the efficient working of turbines

Hassard, Richard. (Analysis of his Evidence)—continued.

turbines; no diminution in water power would be entailed by the employment of the submerged trough as a fry-guard, but if lattices were used a slight enlargement of the mill-races might be necessary, 4643-4659, 4768-4782, 4888-4904—Estimate that the cost of the trough recommended would not exceed 25 £, 4660-4662—Opinion that gratings at the head and tail races of mills offer no obstruction to the passage of the water; inability of witness to understand the millowners' objection to such protections, 4663-4667.

Statement as to the injury done to the fish by the neglect of the proprietor of the Castledawson Mill (Derry), to close his sluices when the machinery is not working, 4668-4680—Opinion that automatic fish-passes might easily be devised which would allow the fish to pass up the river as and, at the same time, increase the water-power of the mills, 4681-4684, 4820-4822, 4951-4955—Conclusion that Mr. Macartney's Bill is unnecessary and likely to prove very destructive to the fisheries, 4685-4687, 4695, 4696.

Belief that very few, if any, salmon-fry would be able to pass to safety through such a turbine as that in operation at Mr. Dinmore's mills, 4687-4694, 4827-4847, 4946-4955—Evidence as to the necessity for efficient fish-passes in the rivers; any legislation in regard to fisheries should take cognizance of this point, 4697, 4798-4798—Information relative to the value of turbines as a motive power; by their adoption the millowners get an increase of water-power varying from 25 to 40 per cent., 4698, 4699, 4823-4826, 4968.

Opinion as to the injustice of allowing millowners to erect dangerous machinery without providing adequate protection for the fish, 4700, 4767, 4968-4972—Belief that the cost of providing all the safeguards that could possibly be required at Mr. Webb's mills would not exceed 160 £ and might be erected without stopping the machinery for longer than two nights; witness entirely disputes the accuracy of the estimate by that gentleman and other witnesses to the effect that the cost of complying with the conservators' requisitions would be about 1,400 £; 4701-4737, 4744, 4747-4755, 4906-4912, 4956, 4967.

Further evidence in explanation of the working of the various protective appliances recommended by witness; assertion that such safeguards might easily be kept clear from obstruction, 4738-4743, 4745, 4745, 4783-4790, 4966, 4967—Examination respecting the difference between smolts and salmon fry, the former being small fish that have already descended to the sea, 4792-4795, 4991-5006—Opinion that failing the submerged trough recommended by witness other guards of a fairly efficient nature might be put up at a small cost; preference of witness for a grating consisting of vertical bars, 4805-4819, 4850, 4851, 4868, 4913-4916, 4986-4990.

Further reference to the experiments made by Mr. Robinson in passing pieces of wood and turp through a turbine; opinion that these experiments are very unreliable, 4848-4850, 4989, 5011, 5012—Information respecting the shields or submerged troughs in operation at Besbrook and Mr. Gilson's mills; opinion that these guards are currently satisfactory in their working, 4850-4882—Belief that the obstruction in the flow of water occasioned by the erection of lattices might be obviated by putting them up at more favourable places, and by widening the intake of water, 4944-4951.

Admission that witness is not thoroughly acquainted with the differences in the construction of the MacAdam and Loeffel turbines; he has never erected a turbine of any kind, 4939-4942, 4986—Disagreement with certain evidence as to the absolute necessity for the protection of the MacAdam turbine by a shield, 4941, 4943-4945—Opinion that the provision of the submerged trough as recommended by witness would be a fair compromise between the fishery owner and the millowner, 4987, 4988.

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Mill Street (Cork). Reference to the turbine in operation near Mill Street; damage reported to have been done to the sluicings by this machine, *Foley* 5135-5148. 5324-5333.

MILLS AND MILLOWNERS:

1. Generally as to the erection of Gratings, Nettings, &c., by Millowners, and as to the Incidence of the Cost.
2. Relative Interests of Millowners and Fishery Owners; Suggestion that they may be reconciled.
3. Effect of Mr. Macartney's Bill as regards Mills and Fisheries; conflicting Opinions on the subject.

1. Generally as to the erection of Gratings, Nettings, &c., by Millowners, and as to the Incidence of the Cost:

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3. *Effect of Mr. Macartney's Bill, as regards Mills and Fisheries, &c.*—continued.

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Views of witness as to the misleading nature of Clause IV. of Mr. Macartney's Bill; belief that the Bill is quite unnecessary, *Mann* 6300-6309. 6505-6532—Opinion that Mr. Macartney's Bill for the protection of the mills is bad, and would operate very unfairly as regards the fishery owners, *Bund* 6880-6897.

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Decided objection to the present Bill as unworkable, through fear of litigation, and as removing the existing protection of the fisheries, *Hornsey* 8043-8047. 8126-8129. 8161-8163.

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Moles, Edward. (Analysis of his Evidence.)—Is local inspector of fisheries for the Ballymena district; has acted in that capacity for nine years, being in the employment of the board of conservators at Coleraine, 2093-2097.

Statement as to the non-existence of any salmon ladders on the twenty-five weirs in the district inspected by witness, 2098-2101—Evidence as to there being gratings at only twelve mills out of the thirty that are working in the district, 2102-2107. 2113, 2114. 2147.

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Moles, Edward. (Analysis of his Evidence)—continued.

of water-power, but the millowners objected to their having to bear the cost of erection of the gratings, 2228-2236.

Opinion that the blocking-up of the netting produced before the Committee by Messrs. Arthur is a very special case, and due to exceptional causes, 2237-2244—Details as to the trifling expense necessary to provide efficient gratings, and of the facility, if the inspector's directions be observed, with which such guards may be kept clear, 2245-2259—Importance of the provision of bye-washes; opinion that no injury to the working power of the mills would accrue from their construction, 2260-2266.

Information in regard to the very defective grating erected at Mr. Gault's mill; its destruction was due to its being badly designed, 2267-2272. 2280—Description of a grating which, in the opinion of witness, would answer all requirements, at a moderate cost; such gratings are erected at the works of Messrs. Geaghen, Maclean, and Black, 2273-2281. 2286-2290—Statement as to gratings being necessary for only five months of the year, 2282-2285.

[Second Examination.]—Opinion that the millowners would have very little trouble in keeping the fry-guards clear during the few months in the year that their erection is requisite; disagreement with Mr. Wilson's evidence on this point, 2306-2319. 2753-2755—Evidence in support of contention that Canadian weed is not injurious to the fish, 2313-2316. 2354-2370. 2732—Estimate that more than half of the expenditure of the conservators is incurred in watching mill-races, &c., 2317-2319.

Details of the circumstances under which Mr. Webb was summoned and fined for not erecting the fish-guards, &c., required by the conservators; admission that one conviction was quashed on appeal on account of the lack of engineering evidence, 2320-2356. 2614-2621—Particulars respecting the summonses issued against other millowners in the Ballymena district with the result of their being fined, 2357-2370—Evidence respecting the invitation given to witness by Mr. Webb to make an inspection at his mill in order to ascertain whether any fish were injured; statement that it would have been impossible to distinguish anything while the mill was at work, 2375-2382. 2518-2527.

Information respecting the wholesale exemptions granted to the millowners since the date of the prosecutions before alluded to; facility with which such exemptions were obtained even at mills where it was clear that injury was being done to the fish, 2383-2403. 2434-2452. 2733-2735. 2777-2782—Denial that there is any ground for the suggestion that Mr. Webb was singled out for prosecution because of his prominence in the millowners' agitation, 2405-2412.

Statement that the decrease in the number of anglers is due to the deterioration of the fishing; opinion that this decrease affects not only the welfare of the conservators, but that of the whole district, 2413-2418—Information respecting the prosecutions for poaching during the last six months; admission that one case only out of thirteen was in connection with mills, 2419-2423—Opinion that the passing of Mr. Macartney's Bill will mean the total ruin of fishing, 2424-2432. 2735. 2737.

Examination respecting the experience and acquaintance of witness with the habits of salmon, 2453-2464. 2771-2774—Details of the numerous cases of injury to fish and salmon-fry by turbines that have come under the observation of witness during the last twenty years; action taken by him in reporting such damage to others than the board of conservators, 2465-2517. 2528-2563. 2622. 2637. 2686-2727.

Further reference to the total destruction of the fishing in certain rivers by the action of the turbines and by the poisonous matter from paper-mills, flax-works, &c., that has been allowed to contaminate the water, 2671-2677. 2673-2678—Reiteration of statement that lattices of a satisfactory nature were erected and kept in position by the millowners during the years 1890 and 1891; information respecting the inspections and surprise visits made by witness at night at certain mills with the view of ascertaining that the conservators' requisitions were not being evaded, 2678-2605.

Efficiency of the perforated fry-guard erected at Mr. Geaghen's mills; opinion that this grating does not diminish the water-power, 2606-2613. 2668-2672—Additional information respecting the importance of providing bye-washes and salmon-passes over weirs; details concerning the objections of millowners to erect such safeguards, 2637-2667. 2679-2685.

Further details respecting the injuries inflicted on fish by turbines; reference to the letters on the subject received by witness from anglers who have seen dead fish floating in the rivers, 2686-2708. 2744-2752. 2763-2770—Statement that pike have decreased in number of late years, 2728-2731—Opinion that the expense of any safeguards found necessary to be erected for the protection of the fish should fall upon the millowners, 2738-2743.

Moore, R. L. (Analysis of his Evidence.)—Is a conservator of the Ballyshannon, Londonderry, and Coleraine districts of fisheries; is also managing partner of the Foyle, the Bann, and the Erne fisheries, and has been connected with fisheries since 1864; 3711, 3712.

Information respecting the appointment of the conservators, there being three classes: viz., riparian owners, owners of fisheries valued at 100 £ per annum, and those who are elected by the fishermen and anglers, 3713-3719.—Illustration by means of a map of the salmon breeding area of the rivers in Ireland; in the Foyle, Erne, and Bann rivers there are 550 miles only available for that purpose, 3720-3730.—Assertion that the salmon breeding in the Bann has been reduced by one-half, and totally destroyed on the six-mile water, by the action of mill-dams, turbine-wheels, and other motors, and by poisonous matter, 3731-3742. 3889-3893, 3989.

Evidence as to the impracticability, owing to want of funds, of the proposition in Mr. Macartney's Bill for throwing the expense of protecting turbines on the shoulders of the conservators; details given, showing that their expenditure is largely in excess of their income, which has to be supplemented by subscriptions from the lessees of the fisheries, 3743-3790. 3882, 3969, 3980.—Estimate that the fisheries in the district of which witness is a conservator give employment to over 2,000 men; opinion that this industry would be ruined by the passing of Mr. Macartney's Bill, 3791-3814, 3979-3982.

Reference to a visit paid by witness and Mr. Hassard to the various mills on the River Bann; complaint that, with the exception of Mr. Gilman's mill, none of them had efficient fry-guards during the important months of April, May, and June, 3815-3833.—Statement that the inspectors of fisheries have used their powers of exemption very largely, 3834.

Grounds for the conclusion that great injury is done to the salmon by turbine-wheels; reference to an experiment made by Mr. Macleod who found that only sixteen salmon fry out of thirty-two passed through a turbine without injury, 3835, 3836, 3862-3879, 3955-3967, 3971, 3978, 4013-4015.—Reference to the prosecution of Mr. Webb by the conservators for non-compliance with their requisitions for efficient fry-guards; there was no disposition to harass the millowners, and it was only on perceiving the damage that was done by the turbines that such proceedings were taken, 3837-3850.

Conclusion that there is nothing antagonistic between the salmon and the mill industries, and that fry-guards might be easily devised which would provide the protection required in the months of April, May, and June, 3851-3869, 3961-3963.—Opinion that the millowners should bear the cost of providing protection for the fish, 3881, 3883-3888, 3912.

Decided objection to Mr. Macartney's Bill, which would, if passed, enable the millowners to erect what machinery they pleased without efficient protective appliances; the valuable Irish fisheries would thereby be ruined and large numbers of men thrown out of employment, 3880, 3882, 3895, 3897, 3938-3954.—Dissent from statement that the decrease in the number of fish is due to improved methods of capture, to poisoning, and other causes, 3898-3904.—Utility of fish-ladders; the conservators have no power to enforce their erection, 3905-3925.

Dissent from the assertion that the salmon have been injured by American weed, and by the efforts of the keepers to poison the pike, 3926-3937.—Estimate that the value of the salmon fisheries in Ireland is about 600,000 £ a year, 3973-3978.

[Second Examination.]—Further details concerning the working of the Foyle, Bann, and the Erne fisheries (by a private syndicate); the rent of the two former is 5,000 £ a year, and the latter fishery was bought for 45,250 £; 4016-4025.—Comparison of the real value of the above fisheries with the poor law valuation; denial that the Bann fishery is of the greatest value, 4026-4028, 4346-4368.

Explanation showing that the figures given in the returns of the fishery inspectors in regard to the 10 per cent. valuation do not necessarily represent all that is paid by the proprietors of these fisheries; apart from their subscriptions the fishery owners expend considerable sums in protecting their fisheries, 4029-4040, 4052-4059, 4177-4186.—Information as to the non-payment of the 10 per cent. valuation in cases where the license duties payable exceed that percentage, 4041-4043, 4080, 4081, 4370-4374.

Reference to an assertion made by the inspectors of Irish fisheries in their report respecting the non-payment of the 10 per cent. charge; denial that this refers to the fisheries in which witness is interested, 4044-4051, 4082-4088.—Statement that, to the knowledge of witness, no action has ever been taken to find out the defaulting parties or to enforce the due payment of this percentage, 4069-4072.

Estimate of witness that there are only 100 miles of the Bann and its tributaries available for salmon-breeding; explanation that this distance represents the different mileages of the tributaries of that river that are not stopped by either mill-weirs or turbines, 4073-4086.—Opinion that flax-water is not so destructive to the fish as it is represented to be; reference to experiments made by witness who found that water one-half of which is flax-water is not injurious to the salmon, 4087-4099.—Examination

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Moore, R. L. (Analysis of his Evidence).—(Second Examination).—continued.

as to the absence of any reference in the reports of the Inspectors of Fisheries to damage done to fish by turbines; inability of witness to explain this omission, 4101-4111.

Admission that although damage to the fishery interest had been going on for years, it was not till the year 1885 that the attention of the mill-owners was directed to the fact of their not having erected protective appliances, 4112-4122.—Statement that the scarcity of fish passes may be attributed to the inability of the conservators to enforce their erection by the millowners owing to the unsatisfactory state of the law, 4123-4158.

Further evidence relative to the damage done to the fisheries by mill-dams, turbine-wheels, and other motors; explanation that the bucket-wheels do a certain amount of damage, 4159-4161. 4264-4268.—Further examination also respecting the alleged total destruction of the salmon fishing in the Six-mile-water by turbines, &c., 4162-4175. 4461-4474.—Consideration of the evidence given by Mr. Cadie, and of his statement that turbines inflicted no damage on the fish, 4176, 4177. 4434-4446.

Particulars with further reference to the very large number of men who are dependent on the fisheries for their livelihood, 4187-4192. 4404. 4418, 4419.—Conclusion that the boat-owners who carry on their operations round the coast might fairly be called upon to contribute towards the protection of the salmon in the rivers, 4194-4229.—Opinion that any fly-guard, with a mesh larger than three-eighths of an inch, would be useless as a protection to the salmon fly; necessity for the erection of efficient fly-guards, 4247-4263.

Conclusion that there need be no antagonism between the respective industries of fishing and mill-working, but that the millowners should not be permitted to injure the former industry, 4271-4278. 4305, 4306. 4408-4416. 4421.—Examination in reference to the unqualified objection of witness to Mr. Macartney's Bill, 4282-4304. 4480-4508. Great value of the salmon exports further adverted to; statement that the estimate of 600,000 *l.* given by witness represented the retail and not the wholesale price realised, 4331-4345. 4411.

Information respecting the experiment made by Mr. Macdermott in passing salmon-fly through a turbine with the result of finding that only one-half of their number escaped injury; witness has no reason to believe that Mr. Macdermott did not conduct this experiment with the greatest care, 4380-4394. 4427-4433. 4439-4441.—Admission that the method adopted in catching fish at Culterane by means of a net spread across the river is liable to prevent the salmon from passing up the stream, 4385-4390.—Reference to the fish-pass at Maguire's Bridge; impracticability of constructing such passes on the Bann owing to difficulty of getting sufficient water, 4391-4397.

Objection of witness to contribute towards the erection of guards and gratings; the mill-owners should be required to bear the whole of this expense, 4412-4417. 4422-4424.—Opinion that fly-guards might easily be devised which, while effectually protecting the fish, would, in no way, interfere with the water power of the mills, 4445-4447.

Repetition of statement that there is no desire on the part of the conservators or the fishery owners to inconvenience the millowners, 4448-4450.—Opinion that it would be useless to prescribe any particular form of grating or fry-guard which should be used universally; the nature of such guards should vary according to the particular circumstances of the case, 4457, 4458. 4475-4477.

[Third Examination.]—Statement that smolts, as a rule, proceed down the rivers with their heads pointing up-stream; inability of witness to say in what position they would be drawn down the pipe of a turbine, 5791-5794.—Explanation that unless the fish swim down the rivers at a faster rate than the stream is running they are in danger of being drowned by the water which would enter their gills, 5795-5800. 5803-5806. 5809-5815.—Opinion that the rush of water at the entrance pipe of a turbine is so great that the fish cannot possibly control their movements, and would be washed down in any position, 5811, 5812. 5816, 5817.

Belief that there is no probability of smolts or salmon fry getting washed up against the gratings of mill-races, as suggested by Mr. Macartney, 5818-5822.—Opinion that the proper position of gratings would be at the intakes of the mills, 5823-5828.—Statement to the effect that the natural fall of a fish over a weir is very different and less likely to be injurious than the sudden fall down the pipe of a turbine, 5829-5839.

[Fourth Examination.]—Numerous corrections made by witness in his previous evidence, 5914, 5915.

Munn, Alfred Moore. (Analysis of his Evidence).—Is a solicitor practising in Londonderry; has acted as the legal adviser to the board of conservators of the Londonderry Salmon Fishery District for about 15 years, 6288-6290.

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Mason, Alfred Mosse. (Analysis of his Evidence)—continued.

Reference to the provision made for the erection of gratings and lattices by the 75th Section of the Act of 1849; statement relative to the fact that this Act is not operative in regard to mills, 6234-6299—Views of witness as to the misleading nature of Clause IV. of Mr. Macartney's Bill; belief that the Bill is quite unnecessary, 6300-6309. 6505-6532.

Explanation of the Act of 1863, under Section 30 of which it is provided that gratings shall be erected in front of turbines under certain penalties for non-compliance; opinion as to the equity of this law, inasmuch as proof is required that such machines are injurious to the salmon, 6310-6315. 6325. 6338-6339. 6479-6489—Reference, in support of the above contention, to the prosecution of Mr. Webb by Mr. Mola, and to the failure of the action owing to absence of proof that any injury had been done to the fish by the turbines, 6316-6327. 6500-6504. 6534. 6539.

Evidence in regard to the provisions of the 4th Section of the Act of 1859; statement that this Act, by its exemption clause, rendered the previous enactment of 1849 operative as regards mills, 6330-6344. 6562-6564—Opinion that the exemption to which reference is made in this Act applies to lattices only, 6345-6352. 6553-6557.

Unqualified objection of witness to Mr. Macartney's Bill on the grounds that it would, if passed, have the effect of repealing the whole of the existing laws with regard to gratings and lattices, would annihilate the fisheries of Ireland, and would confiscate existing fishery rights; details in support of the above objections, and reference to Mr. Willis Budd's book on the English salmon fisheries, 6353-6384.

Opinion that the expense of erecting protective guards in front of turbines should fall upon the millowners, and not upon the conservators, 6385-6408. 6542—Conclusions as to the great injury to public and proprietary rights attendant on any damage to the salmon; estimate that there are a thousand men dependent on the fisheries at the estuary of the Foyle, 6408-6411. 6414-6421—Denial of the statement that the owners of the fisheries at the mouth of the Ban employ tugs to destroy the fishermen's nets, 6412, 6413.

Further objection to Mr. Macartney's Bill on the ground that it does not provide for the erection of fish-passes or ladders, 6422-6424. 6432-6434—Statement that under the existing law the fishery owners have no summary remedy whereby they could enforce the erection of fish-passes; reference to case where this was decided, 6425-6431. 6472-6475. 6572-6575—Opinion that the deterioration in the fishings is not due to any increase in poaching; witness denies that poaching cases have increased, or that there have been more convictions for discharging flux-water into the rivers, 6437-6445. 6552.

Explanation of the difference between salmon-fry and smolts; necessity for the latter to go down to the sea, 6447-6450—Conclusion that the agitation against the present existing law in regard to gratings or fry-guards arose out of the action of the millowners on the Ban in resisting the regulations of the conservators for the erection of proper protective appliances, 6451-6457—Reference to the Scotch law with regard to gratings, &c.; opinion that there is very little difference between the salmon laws of the two countries, 6458-6470. 6476. 6477.

N.

Nettings (Turbines). See *Gratings, &c.* *Turbines.*

O.

O'Toole, James. (Analysis of his Evidence).—Is resident engineer in charge of the Cork Waterworks; has occupied that position since 1879, and has considerable experience of turbines and water-wheels, 5840, 5841. 6007, 6008.

Statement that there are two turbines of the MacAdam type, and two on the Fourneyron system in operation at the above works; details in explanation of the working of these machines, 5842-5854—Description, illustrated by the production of specimen, of the fry-guards recently erected at the works; lattices were tried for many years, but owing to the difficulty of keeping them clean, they were replaced by the present protections, which are eminently satisfactory, 5855-5870. 5879, 5880. 5885-5888. 5890, 5891. 5901-5911. 5950-5958. 6107, 6108.

Assertion that the guards alluded to interfere in no way with the water power, or the working of the turbines, and are easily kept free from obstruction, 5871-5878. 5888, 5889. 5898-5900. 5941-5943. 5946-5948. 5950-5990. 6005, 6006. 6094-6095—Opinion that the original guards at the Cork Waterworks were erected on account of the great damage inflicted on the salmon-fry by the working of the turbines, 5881-5884. 5915-5928. 5944, 5945. 5949-5951. 6109-6115—Need of guards for only two months in the year, 5892-5893. 5959.

O'Toole, James. (Analysis of his Evidence)—continued.

Information respecting the provision of duplicate or spare guards in case those in ordinary use are rendered useless for a time; these duplicates can be readily fixed up, 5895-5897.—Estimate that the fry-guards under discussion would cost about 200 l., 5912-5917. 6101-6105.—Opinion that it is impracticable for fry or smolts to pass through turbines without receiving serious injuries, 5929-5939. 6044-6046.

Disagreement of witness with the evidence given by previous witnesses relative to the great advantages of turbines over other motors, 6018-6024. 6119-6125.—Concurrence with the evidence given in regard to the necessity of a special protection for the MacAdam class of turbine, 6035-6043.—Reference to the experiments made by Mr. Robinson in passing pieces of wood and turnip through a turbine; unsatisfactory nature of these tests, 6047-6064.—Statement that witness has seen fry, after coming down the mill-races as far as the gratings, swim back and go over the weir, 6065-6089. 6126-6143.

[Second Examination].—Further information respecting the guards which were invented and placed in position at the Cork Waterworks by witness, 6284-6287.

P.

Peterson James. (Analysis of his Evidence).—Is a barrister-at-law in practice in England; has bestowed great attention on the laws relating to mills, and has considerable experience of the fisheries in Ireland, 6144-6146. 6195. 6210-6214.

Opinion that the fishery laws in Ireland are greatly in advance of those obtaining in England; up to the year 1861 there were practically no laws regulating salmon fisheries in the latter country, 6148. 6149. 6206. 6207.—Explanation in detail of the theoretical powers of protection for fish possessed by the fishery and riparian owners under the common law, 6150-6162. 6179. 6215-6233.

Evidence as to the unsatisfactory nature of the law and the necessity for special legislation whereby the initiative in taking proceedings will not be left to the various fishery owners; explanation that millowners were often able to plead prescriptive right owing to their action in erecting mills, &c., not having been proceeded against within the term of twenty years, 6163. 6164. 6167. 6168. 6178-6180. 6223-6227.—Definition from a legal point of view of the term "injuries," which would be inflicted on the riparian owners by the erection or existence of mills; opinion that such erections cause great damage to the fishing interest by their effect in obstructing the passage of fish up and down the rivers, 6165. 6166.

Examination respecting the provision in the various Acts for the efficient protection of turbines, &c., by gratings; admission that as regards mills, the Act of 1869 affords very good protection, 6169-6177. 6179. 6181-6187. 6248-6255.—Disagreement with the opinions expressed by previous witnesses to the effect that, in some respects, the Act of 1869 is inoperative, owing to their being no penalties fixed; conclusion that under this Act the conservators have adequate means of protecting the fisheries, 6189-6191. 6197-6199.—Opinion that the salmon fisheries in England are of no particular value, whilst those of Ireland are of a distinctly more valuable character, 6194. 6196.

Statement of objections to Mr. Macartney's Bill on various grounds, the chief being the unfairness of shifting the initiative and expense of providing proper protection for the fish from the millowners to the conservators; assertion that the latter body have no funds wherewith to undertake such work, 6192. 6193. 6195. 6200-6205. 6202-6209.—Explanation of the powers vested in the inspectors of fisheries relative to the granting of exemptions from erecting gratings; statement as to the great number that have been granted in the county of Antrim, thus rendering useless the Acts passed for the protection of the fish, 6256-6283.

Perry, James. (Analysis of his Evidence).—Is county surveyor of Galway, is a master in engineering of the Royal University, and has had exceptional opportunities of studying hydraulics, 6579-6582.

Opinion that any fish which would pass through the ordinary re-action turbine would pass through in safety, but damage might be done to the fish by turbines having closely-set guides and vanes, 6583. 6611. 6626. 6832.—Testimony to the great value and efficiency of turbines as compared with the old-fashioned water-wheels, 6584.—Statement that the Hercules class of turbine is used at the works of which witness is one of the engineers, 6586.

Reference to experiments made by witness in passing certain articles, such as bottles and eggs, through this machine; very little damage sustained by these articles in their passage down the turbine, 6587-6589. 6592. 6593. 6610. 6671-6707. 6825-6830. 6838-6840. 6844. 6845.—Evidence as to the tests carried out by the lessee of the Galway fishery in the presence of Mr. Horsley and Sir Rowland Blennerhassett; fry were passed through the turbine, but it could not be discovered that they had suffered any injuries, 6590. 6591. 6725-6729.

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Perry, James. (Analysis of his Evidence)—continued.

Details in explanation of the working of turbines; conclusion that injury would be done to the fish only by impact, which should not exist if the machine were properly constructed, 6593-6626, 6645-6670, 6708-6719.—Objection to the erection of perforated plates or submerged troughs on the ground that a widening of the intake of the turbine would be necessary, which would not be possible, 6627-6630, 6773-6780.

Immense injury in Galway if existing powers were strictly enforced, 6829-6834.—Opinion that the strict carrying out of the powers vested in the Fishery Commissioners would ruin all business undertakings that depended on water power for their machinery; conclusion that the fishery inspector should have full power of granting exemptions, 6831-6839.

Amicable relations existing between witness and the lessee of the Galway Fishery; explanation as to the latter making provision for the protection of the fish by erecting a guard at the intake of the works, 6832, 6739-6772.—Opinion that with the Hercules turbine no safeguards are necessary, 6843-6847.—Conclusion that annuities are not so easily killed as is commonly believed, 6730-6737, 6841-6845.

Dissent from certain evidence relative to the guards at the Cork waterworks not interfering with the water power; detailed scientific evidence in support of the views expressed by witness, 6781-6816.—Explanation of the working of the McAdam type of turbine such as is erected at Mr. Gilson's mills at Lisnafillan; conclusion that this machine requires a special shield for its protection, and that it would be impossible for any fish to pass through it without receiving injury, 6811-6816, 6831, 6833, 6834.

Petrie, William. (Analysis of his Evidence).—Is the lessee of the Sligo Salmon Fishery; has held this fishery for the past forty years, 3230, 3231.

Information respecting the erection of two turbines at the Pollaxfen (Sligo) mills in the year 1878; originally no fish-guards of any kind were provided, 3234-3241, 3365, 3416, 3417.—Evidence as to the great damage done to the fish by the turbine wheelset statement that soon after the erection of these machines they were found to be completely choked up and rendered incapable of working by the accumulation of dead and injured fish, 3242-3256, 3297, 3298, 3419-3424, 3481-3483.

Action taken by witness in reporting this damage to Sir Thomas Brady, who ordered the erection of certain safeguards, 3257, 3258, 3430.—Evidence to the effect that at first the guards ordered to be erected by Sir Thomas Brady were of little use, but on their being readjusted they were found to act in the most satisfactory manner, and there has since been no complaint, either from millowner or fishery proprietor, 3259-3271, 3288-3292, 3299, 3300, 3308-3310, 3386-3372, 3478-3480, 3492, 3514-3517.—Witness has no reason to believe that the turbines at the Sligo mills differ in any respect from those at other mills or that the mill-race is exceptionally rapid, 3272-3276, 3342, 3343, 3391-3394, 3472-3477, 3513.

Statement that fry-guards are necessary only in the months of April, May, and June, 3279-3281, 3344-3349, 3418.—Opinion that the absence of such guards would inflict a serious blow on an important Irish industry; particulars of the number of people who depend upon the fisheries for their livelihood, 3282-3287, 3324-3336, 3442-3460, 3507-3512.—Detailed description of the fry-guards erected at the Sligo mills; opinion that they cost but little, and that there is no difficulty in keeping them clean and free from obstruction, 3301-3307, 3382-3384, 3395-3415, 3489-3501.—Impossibility of salmon-fry passing through the turbines without receiving injury, 3311-3315, 3387-3390.

Objection to Mr. Macartney's Bill on the ground that it would throw the burden of preserving the fish from injury upon the conservators, who are without the necessary funds; opinion that this expense should be borne by the millowners, 3316-3324, 3431-3441, 3460-3471, 3496-3505.

Phoenix Mill (River Braide). Witness is part owner of the Phoenix weaving manufactory on the River Braide, where employment is given to about 150 hands and one turbine is used, Gault 923-927.—Reference to the prosecution of witness in 1889 and to his being required to erect certain gratings and nettings, &c. 928-933.—Evidence as to the impossibility of complying with these requisitions; statement in regard to Mr. Hornby's recognition of this fact and to the exemption granted by him, &c. 934-949, 985-992, 1010, 1011, 1031-1035.

Opinion that owing to the sluggish nature of the mill-race at the Phoenix works the salmon would be in no danger of receiving injury, even if there were no bye-wash, Gault 983.—Unqualified objection to the erection of any form of grating at the foot of the tail-race of the above mill, &c. 996-1000.—Difficulty of keeping clean such gratings as are now in use, &c. 1005-1007.

Information in regard to the very defective grating erected at Mr. Gault's mill; its destruction was due to its being badly designed, *Males* 2267-2272, 2280.—Explanation as regards the exemption granted in the case of Mr. Gault, *Hornsby* 8105-8111.

Poaching. Evidence as to the practice of poaching in salmon rivers; opinion that fully a third of the prosecutions for poaching in the Londonderry District are brought against the employes of the millowners, *McDermott* 1716-1719. 1823, 1824. 1848. 1911-1921. 1979. 2083-2090.—Prevalence of poaching among the mill hands; great trouble and expense which the conservators are obliged to incur in order to prevent this practice, *Moles* 2009-2015.—Information respecting the prosecutions for poaching in the Ballymena district during the last six months; admission that one case only out of thirteen was in connection with mills, *ib.* 2419-2423.

Evidence respecting the poaching done by persons connected with the mills in Galway county; statement as to the difficulty of its prevention, and the great cost attendant on the conservators' efforts to check this practice, *Hollett* 2871-2890. 3072. 3077-3087.—Conclusion that as regards the Foyle and its tributaries, there has been no increase of poaching, *Nixon* 6437-6444.

Belief that salmon poaching in Ireland has decreased rather than increased for some years past; more effective steps now taken for its prevention, *Sir T. Brady* 6994-7004.—Considerable amount of poaching; doubt, however, as to it being on the increase, *Hornaby* 8171.

Folksefen, Sir George T. (Analysis of his Evidence.)—Very extensive business of witness' firm as millers, merchants, and ship agents at Sligo; payment of about 5,000 £ a year in wages in connection with their mills at Sligo and Ballisodare, the value of the meal, or ground maize, being about 90,000 £; 7404-7421.—Models produced of the grating and fry-guard at the Sligo mills of the firm; very injurious effect as regards the water-power and the efficient grinding of the meal, 7421-7427. 7454-7466. 7559-7589.

Consideration in detail, and contradiction of, various statements in the evidence of Mr. Petrie as to the great destruction of fry and of spent salmon by witness' turbines at the Sligo mills in 1878, and as to the very prejudicial effect upon Mr. Petrie's fisheries in 1879 and subsequently; erection of gratings and wire screens before the turbines were put in operation, 7428 *et seq.*; 7520 *et seq.*; 7608-7614.—Several sworn declarations produced in denial that any fish or fry have been killed by the turbines, 7437-7463.—Opinion that fry could pass through the turbines quite safely, gratings being however always in front of the turbines, 7466-7468.—Belief that Mr. Petrie's statements as to the employment given at his fisheries was much exaggerated, 7469-7473. 7551-7558.

Examination to the effect that fry were killed by being knocked against the wire setting, but not by the turbine, 7480-7500. 7520 *et seq.*; 7608-7615. 7695-7645.—Inaccuracy of a certain diagram in so far as there is no actual mill-race at the Sligo mills; statement borne as to the probable rate of flow of the river above the mills, 7504-7519. 7616-7624.

Explanations with further reference to the objectionable operation of the lattice or wire screen, it being very difficult to keep it clean of weeds, whilst it impairs the effective working of the turbine, 7550-7559. 7604-7607.—Improvement by the use of a grating as erected to the River Lee at Cork; obstruction, however, in this case also, 7592-7606. 7593-7598.

Prosecution of Millowners. See *Ballymena District*, 2, 3. *Greenfield Bleaching and Dyeing Works. Phoenix Mill.*

Public, The. Importance of the public interests in the fisheries as distinguished from the interests of the private fishery owners or the millowners, *Sir T. Brady* 7249-7253. 7257-7261.

Q.

Queen's Gaps (Weirs). See *Fish-passes*.

R.

Riparian Owners. See *Conservators. Fishery Owners.*

Robinson, Stewart John. (Analysis of his Evidence.)—Is engaged in the bleaching and the linen and cotton finishing business on the River Mann and on a tributary of the same; has four turbines in operation at his works, and employs about 100 hands, 1209-1211. 1241. 1275.

Unsolicited exemption from the erection of gratings granted to witness by Sir Thomas Brady, 1212. 1215-1216. 1263-1267. 1243-1249.—Statement that certain wire nettings erected in compliance with requisitions received by witness were taken down on its being found that their presence rendered the working of the mill an impossibility, 1213. 1214. 1219-1221. 1252-1257. 1268.—Importance of turbines in the linen business, 1222-1225.

Assertion

Robinson, Stewart John. (Analysis of his Evidence)—continued.

Assertion that neither salmon fry nor smolts receive any injury by passing through the turbines; results given of experiments made on the subject by witness, 1226-1234, 1299-1309, 1334.—Opinion that the diminution of the number of salmon in the Main is due to several reasons, the principal being the granting of licences at low rates to anglers who kill the fry, 1236, 1237, 1242-1248, 1251, 1289-1298, 1318, 1350-1354, 1368-1373, 1379-1385.

Expression of great dissatisfaction with the existing law as being unfair to the mill-owners and impossible of fulfilment without absolutely ruining the business, 1238-1240, 1258-1262, 1355.—Difficulty of keeping the mill-races clear from obstruction; reference hereon to the gratings placed in front of the turbines for that purpose, 1249, 1250, 1313-1317, 1356-1367.—Objection of witness to the erection of perforated iron plates as guards to the turbines; opinion that such shields would seriously interfere with the water-power, 1310-1312.

Disposition of the millowners to give the conservators every facility for the erection of whatever appliances may be considered necessary for the protection of the fish, always provided that the millowners are not called upon to contribute towards the cost, and that their water-power is not impaired, 1324-1333, 1335, 1336.—Concurrence with Mr. Webb's estimate that the cost of erecting the proposed gratings, &c. would, in his case, be about 1,400 £; 1374-1378.

S.

Salmon Ladders. See *Fish-passes.*

Scotland. Reference to the Scotch law with regard to gratings, &c., the expense being thrown upon the millowner, opinion that there is not much difference between the salmon laws of Scotland and Ireland, *Nixon* 6458-6470.—Objection to the Irish law being assimilated to the Scotch law, *id.* 6476, 6477.

Reference to a report in 1871 by Mr. Backland and Mr. Young upon the Scotch salmon fisheries, in which strong evidence is adduced as to the destruction caused by turbine wheels, *Sir T. Brady* 7094-7098.

Several Fisheries. Several fishery owned by witness in the Ballisodare River, it having been created by Act of Parliament; sole right possessed by him to this fishery, *Cooper* 3518-3522.—Much larger proportion of the fisheries in Ulster than elsewhere which are "several" fisheries; considerable value in the aggregate, *Hornby* 8203-8209.

Shackleton, Abraham. (Analysis of his Evidence).—Is a member of the firm of George Shackleton and Sons, carrying on flour-mills at Lucan, 1386-1417.

Employment of turbines by witness and other manufacturers engaged in business on the Liffey, 1387, 1388, 1419-1422.—Testimony to the great importance and value of these machines as compared with the old water-wheels, 1389, 1390, 1403, 1404, 1411, 1473, 1474, 1486-1490.—Information respecting the requisitions received by witness from the Board of Dublin Conservators for the erection of nettings and lattices; the conservators have not prosecuted witness for non-compliance, and no further requisitions have been received since the beginning of the agitation by the millowners, 1391-1396, 1482-1485.

Alarm with which the possible enforcement of the erection of gratings, &c., is viewed by millowners generally, on account of the injury to business that would ensue, 1397-1401, 1478.—Opinion that no injury has accrued to the fish by the use of the turbine, 1402, 1451-1456, 1475-1477, 1499.—Objection of witness to contribute towards the preservation of the fish, 1406.

Expression of want of confidence in the conservators as being more in sympathy with the sporting than the commercial element, 1411-1416, 1439-1446.—Existence of poaching in the River Liffey a cause for the diminution of fish, 1427, 1428, 1457-1459.—Information with reference to the grating placed in front of the turbine in order to intercept floating debris, 1429-1438, 1447-1450, 1491-1498.—Opinion that any grating devised with the idea of keeping the salmon fry out of the turbines would interfere with the water-power, 1457, 1468.

Six-Mile Water. See *Bann River.*

SLIGO MILLS:

Information respecting the erection of two turbines at the Pollexfen (Sligo) Mills in the year 1878; originally, no fish-guards of any kind were provided, *Petrie* 3234-3241, 3365, 3416, 3417.—Evidence as to the great damage done the fish and to witness's fishery by the turbine wheels; statement that soon after the erection of these machines they were found to be completely choked up and rendered incapable of working by the
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SLIGO MILLS—continued.

accumulation of dead and injured fish, *Petrie* 3242-3256, 3297, 3298, 3419-3424, 3481-3482.

Action taken by witness in reporting this damage to Sir Thomas Brady, who ordered the erection of certain safeguards, *Petrie* 3257, 3258, 3430.—Evidence to the effect that at first the guards ordered to be erected by Sir Thomas Brady were of little use, but on their being readjusted they were found to act in the most satisfactory manner, and there has since been no complaint either from millowner or fishery proprietor, *ib.* 3259-3271, 3288-3292, 3299, 3300, 3308-3310, 3360-3372, 3478-3480, 3492, 3514-3517.

Witness has no reason to believe that the turbines at the Sligo mills differ in any respect from those at other mills, or that the mill-race is exceptionally rapid, *Petrie* 3272-3278, 3342, 3343, 3391-3394, 3472-3477, 3513.—Detailed description of the fry-guards erected at the Sligo mills; opinion that they cost but little, and that there is no difficulty in keeping them clean and free from obstruction, *ib.* 3301-3307, 3362-3364, 3395-3415, 3489-3501.

Very extensive business of witness' firm as millers, merchants, and ship agents at Sligo; payment of about 5,000*l.* a year in wages in connection with their mills at Sligo and Ballisodere, the value of the meal, or ground maize, being about 90,000 *l.*; *Sir G. T. Pollexfen* 7404-7421.—Models produced of the grating and fry-guard at the Sligo mills of the firm; very injurious effect as regards the water-power and the efficient grinding of the meal, *ib.* 7421-7427, 7454-7465, 7559-7569.

Consideration in detail and contradiction of various statements in the evidence of Mr. Petrie as to the great destruction of fry and of spent salmon by witness' turbines at the Sligo mills in 1878, and as to the very prejudicial effect upon Mr. Petrie's fisheries in 1879 and subsequently; erection of gratings and wire screens before the turbines were put in operation, *Sir G. T. Pollexfen* 7428 *et seq.*; 7759 *et seq.*; 7608-7614.

Several sworn declarations produced in denial that any fish or fry have been killed by the turbines, *Sir G. T. Pollexfen* 7437-7453.—Conclusion that fry could pass through the turbines quite safely, gratings being however always in front of the turbines, *ib.* 7466-7468.—Examination to the effect that fry were killed by being knocked against the wire netting but not by the turbine, *ib.* 7480-7500, 7520 *et seq.*; 7608-7615, 7695-7645.

Inaccuracy of a certain diagram in so far as there is no actual mill-race at the Sligo mills; statement borne as to the probable rate of flow of the river above the mills, *Sir G. T. Pollexfen* 7504-7519, 7615-7624.—Explanation with further reference to the objectionable operation of the lattice or wire screen, it being very difficult to keep it clear of weeds, whilst it impairs the effective working of the turbine, *ib.* 7550-7559, 7604-7607.

Witness, who is millwright at Mr. Pollexfen's mills at Sligo, supplies particulars respecting the erection of the grating and lattice at the mills and the dates at which erected, in 1878 or 1879, with reference to the first working of the turbines; belief that the turbine wheels were never choked or stopped up with dead fish, and that fry would not be killed in passing through, *Wetherspoon* 7646 *et seq.*

Particulars respecting a visit of witness to Mr. Pollexfen's mill at Sligo, in 1878 or 1879, when he found that the lattice was placed inside the sluices, and that when the latter was raised the fry were dashed against the lattice and killed in considerable quantities; removal of the lattice outside the sluice as suggested by witness, *Sir T. Brady* 7765 *et seq.*; 7819-7823.—Official records producible on the foregoing matter, *ib.* 7771, 7772, 7775-7788, 7789.

Explanation that at Mr. Pollexfen's mill the fry were killed by the lattice or wire netting (put up by direction of the fishery authorities) when the sluice was raised, *Webb* 8005-8012.

Smolts. See *Fry and Smolts.*

Submerged Trough. Grounds for the opinion that the most efficient means of protecting turbines without interfering with the effective working of the mills would be by drawing water from the mill-race by a submerged trough; sketch produced by witness of such a trough in use at the Besebrook factory near Newry, *Harvard* 4570-4579, 4591, 4595, 4596, 4600, 4601, 4603-4610, 4615-4625.

Further reference to the submerged trough recommended by witness as the best fry-guard; the objections raised by Mr. Webb to such guards as being likely to get blocked up must be founded on a misconception, *Harvard* 4634-4649.—Information respecting the supply of water necessary for the efficient working of turbines; no diminution in water-power would be entailed by the employment of the submerged trough as a fry-guard, but

Submerged Trough—continued.

but if lattices were used a slight enlargement of the mill-races might be necessary, *Hasard* 4643-4649. 4768-4782. 4888-4904 — Estimate that the cost of the trough recommended would not exceed £5 L; *ib.* 4660-4662.

Information with further reference to the shield or submerged troughs in operation at Bessbrook factory and Mr. Gilson's mills; opinion that these guards are eminently satisfactory in their working, *Hasard* 4852-4882 — Opinion that the provision of the submerged trough would be a fair compromise between the fishery owner and the mill-owner, *ib.* 4987, 4988.

Objection in witness' case to the erection of perforated plates or submerged troughs on the ground that a widening of the intake of the turbine would be necessary, which would not be possible, *Perry* 6627-6630. 6773-6780.

T.

Tidal Fisheries. Conclusion that the tidal fisheries must inevitably fall off if the breeding of fish in the rivers is not protected, *Buad* 6875-6879.

TURBINES:

1. *Evidence as to the Value of Turbines in the Milling and Manufacturing Industries of Ireland, and as to their increasing Adoption.*
2. *Different kinds of Turbines in use.*
3. *Denial that Salmon Fry or Smoults are killed or injured by the Turbines.*
4. *Evidence to the effect that Turbines are very destructive to the young Fish.*

1. *Evidence as to the Value of Turbines in the Milling and Manufacturing Industries of Ireland, and as to their increasing Adoption:*

Explanation of the very great advantages attendant on the use of turbine wheels in the milling business; witness attributes the extension of Irish industries to their introduction, *Webb* 73-78. 265. 268. 272. 317 — Testimony to the great advantages attendant on the use of turbines as compared with the old-fashioned water wheels, *Dismore* 385-390; *Wilson* 608-610; *Cadle* 807-810. 845-849. 921; *Perry* 6534 — Considerable development in the erection of turbines of recent years, *Cadle* 785 — Great importance of turbines in connection with the industries of Ireland, *Gault* 930-952 — Value of the turbine in connection with any trade or business dependent upon water-power, *Gilson* 1083-1086. 1091 — Importance of turbines in the linen business, *Robinson* 1222-1225.

Concurrence in the view as to the great importance and value of these machines as compared with the old water wheels, *Shackleton* 1389. 1390. 1403. 1404. 1418. 1473. 1474. 1486-1490 — Information relative to the value of turbines as a motive power; by their adoption the millowners get an increase of water-power varying from 25 to 40 per cent., *Hasard* 4698. 4699. 4893-4896. 4968 — Testimony to the great value of turbines as compared with the old-fashioned water wheels; coincidence of witness in the estimate given by previous witnesses that the millowners gain from 25 to 40 per cent. more power by their employment, *Bodmer* 5565. 5566. 5649-5654. 5690-5696.

Disagreement of witness with the evidence given by previous witnesses relative to the great advantages of the turbines over other motors, *O'Toole* 6018-6034. 6119-6125.

Large increase anticipated in the use of turbines, so that it is the more necessary that they should not be allowed, indiscriminately, to interfere with the food supply and with employment, *Sir T. Brady* 7211-7214. 7234 — Constant increase going on in the number of turbines, *Horsley* 8083-8087.

2. *Different kinds of Turbines in use:*

Explanation with plans and sketches of the construction and the working of the different kinds of turbines, *Wilson* 842-844. 678-683. 701. 703. 704 — Details in explanation of the construction and working of turbines, with illustrations from a model produced by witness, *Cadle* 811-817. 853-857.

Information respecting the disadvantages of the McAdam turbine owing to its shield being so liable to get fouled; intention of witness to erect another machine, but of a different make, *Gilson* 1076-1082. 1097-1100. 1107-1108.

Detailed description illustrated by models and drawings of the various kinds of turbines and their working, *Hasard* 4512-4525 — Admission that witness is not thoroughly acquainted with the differences in the construction of the McAdam and Loeffel turbines; he has never erected a turbine of any kind, *ib.* 4939-4942. 4986 — Dissent from certain evidence as to the absolute necessity for the protection of the McAdam turbine with a shield, *ib.* 4941-4945.

TURBINES—continued.

2. *Different kinds of Turbines in use—continued.*

Evidence respecting the working of turbines and the water-power necessary for them; opinion that properly constructed gratings would not affect the water power to any extent, *Foley* 5081-5084, 5096-5105, 5217, 5227-5259-5277.

Witness concurs in the evidence given by previous witnesses relative to the necessity of providing special protection for the McAdam turbine, which although out of date is a very good machine, *McDonnell* 5454-5476-5480.

Detailed information respecting the nature of the various kinds of turbines in use, with explanation of their working; statement that, broadly speaking, there are two systems of turbines, the Reactionary and the Impulse, of which the latter is the more modern although both are in general use, *Bodmer* 5510-5522, 5551-5553, 5582-5610, 5619, 5629, 5655-5668.

Explanation of the working of the McAdam type of turbine, such as is erected at Mr. Gibson's mills at Lismallick; conclusion that this machine requires a special shield for its protection, and that it would be impossible for any fish to pass through it without receiving injury, *Perry* 6511, 6816-6831, 6833, 6834—Belief that the adoption of the Hercules class of turbine by millowners generally would render the erection of safeguards for the protection of fish unnecessary, *ib.* 6643-6545.

3. *Denial that Salmon Fry or Smolts are killed or injured by the Turbines:*

Opinion that the fish are not likely to be injured in any way by the turbine wheels, even in the case of the most rapid mill-race, *Dismore* 391-401, 405, 407, 423-434, 463-471, 526—Denial that in witness' case the fish are injured by the turbine wheels, *Arthur* 570-575, 590—Opinion that neither salmon nor salmon-fry get into the turbine wheels, as the vibration frightens them away; no injury to the fish has come under the observation of witness, *Wilson* 628, 635, 635-641, 646-649, 661-667, 673-677, 700-705, 766-774.

Conclusion, as the result of careful investigation, that neither the grown fish nor the salmon-fry are liable to receive injury from the turbines; facility with which articles of large size pass through these machines, *Cudde* 790-798, 858-865, 882-885—Examination upon the assertion that fish have been seen in the mill-races and that they apparently received no injury, *ib.* 818-820, 833-838, 870-876.

Assertion that no injury to fish through the employment of turbines has ever come under the observation of witness, *Gault* 933-933, 994, 1004, 1065—Opinion that fish although frequently found in the mill-races do not pass through the turbines, *ib.* 954-955, 1008, 1009.

Statement that witness has never discovered that any injury has been done to the fish by these machines, *Gibson* 1087, 1102-1105, 1183—Opinion that the shield of the McAdam turbine would effectually stop fish from going down the mill-race, *ib.* 1096, 1099—Belief that no injury has occurred to the fish by the use of the turbine in witness' case, *Shackleton* 1408, 1451-1456, 1475-1477, 1499.

Opinion that anything which would pass through the ordinary re-action turbine would pass through in safety, but damage might be done to the fish by turbines having closely set guides and vanes, *Perry* 6583, 6611, 6626, 6832—Reference to experiments made by witness in passing certain articles, such as bottles and eggs, through the Hercules machine; very little damage sustained by these articles in their passage down the turbine, *ib.* 6587-6589, 5592, 5593, 5610, 6671-5707, 5825-6830, 5838-6840, 6844, 6845—Details in explanation of the working of turbines; conclusion that injury would be done to the fish only by impact, which should not exist if the machine were properly constructed, *ib.* 6593-6626, 6645-6670, 6708-6719.

Positive denial of statements that on several occasions dead fry have been found below witness' turbine wheel by Mr. Moles (the local fishery inspector); untrustworthy character of his statements generally, *Webb* 7935, 7999-8000—Allegation that where gratings are only about an inch and a-half between the bars the fry will not pass through them to the turbines, but will turn back and go up stream, *ib.* 8003, 8004.

4. *Evidence to the effect that Turbines are very destructive to the young Fish:*

Opinion that the introduction of turbines on the Foyle would completely destroy the fishing; assertion, moreover, that the fishery interest on the River Bann has been ruined by mills and factories, *St. Omer* 1686-1689, 1813-1822, 2091, 2092—Witness has no practical experience of turbines, but is of opinion that salmon fry in passing through such machines must inevitably receive injuries; illustration to this effect, *ib.* 1752, 1783-1790, 1846, 1847, 1849, 1865, 1866, 1928-1928, 2009-2011, 2017.

Witness has seen both fish and salmon fry in the mill-races near the turbines and has found numbers of both killed, *Moles* 2125-2149—Instance given of a turbine being stopped by an eel getting into its interior, *ib.* 2150-2155—Expression of doubt as to the

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TURBINES—continued.

4. Evidence to the effect that Turbines are very destructive, &c.—continued.

the possibility of salmon fry being able to pass through a turbine wheel without injury, *Moles* 2126-2162. 2170-2175—Corroboration of Mr. McDermott's evidence in regard to the small fish, as affected by turbines, *ib.* 2176-2178.

Details of numerous cases of injury to fish and salmon fry by turbines, that have come under the observation of witness during the last twenty years; action taken by him in reporting such damage to others than the Local Board of Conservators, *Moles* 2465-2517. 2528-2563. 2622-2637. 2686-2727.

Further details respecting the injuries inflicted on fish by turbines; reference to the letters on the subject received by witness from anglers who have seen dead fish floating in the rivers, *Moles* 2686-2708. 2744-2752. 2763-2770. 2731.

Concurrence in the opinion that it is impossible for fry or smolts to pass through turbines without receiving serious injuries, *Patric* 3311-3315. 3387-3390; *O'Toole* 5929-5939. 6044-6046—Opinion that turbines inflict great injuries on the fish; if suitable guards had not been erected, the fishery of witness would have been destroyed, *Cooper* 3552-3554. 3582.

Immense injury to the fisheries in the Banu and Six-Mile Water since the introduction of turbines, *Moore* 3731-3742. 3889-3993—Examination as to the absence of any reference in the reports of the Inspectors of Fisheries to damage done to fish by turbines; inability of witness to explain this omission, *ib.* 4101-4111.

Further evidence relative to the damage done to the fisheries by mill-dams, turbine wheels, and other motors; explanation that the bucket wheels do a certain amount of damage, *Moore* 4159-4161. 4264-4266—Explanation with reference to certain evidence given by Mr. Cadle as to turbines not having inflicted damage on the fish, *ib.* 4176, 4177. 4431. 4446.

Opinion that turbines inflict great injuries on the fish, but that the amount of damage varies according to their nature and construction, *Foley* 5051-5060. 5297-5303—Increased damage likely to be done to the salmon fishing if turbines were generally adopted in Ireland and were not officially protected, *ib.* 5069, 5070. 5118-5134. 5149-5154.

Belief that turbines inflict injury on fish and salmon-fry; reference to a case where a turbine was stopped by an eel getting entangled in its interior, *McDonnell* 5397-5417. 5471-5473—Evidence in support of the opinion as to the extreme probability of the fry and smolts receiving serious injuries in passing through these machines, *Bedmer* 5523-5550. 5554-5564. 5611-5618. 5620-5630. 5674-5689. 5698-5713.

Opinion that the velocity with which smolts must be shot into the turbines would be sufficient to kill them quite apart from the danger they run of being crushed by the machinery when passing through, *Bedmer* 5578-5581—Concurrence in the view that the rush of water at the entrance pipe of a turbine is so great that the fish cannot possibly control their movements and would be washed down in any position, *Moore* 5801, 5802. 5816, 5817.

Absence of any such vibration in the gratings as to deter the fry from passing through to the turbines, *Sir T. Brady* 7812-7815—Conclusion that some turbines are very destructive to the smolts and fry, whilst others do no material damage; reference to some experiments on the subject, *Hornsey* 8014-8016. 8112, 8113. 8118-8125. 8186-8189. 8210-8212.

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| <i>See also Acts of Parliament.</i> | <i>Balsodere River.</i> | <i>Ballymena District.</i> | <i>Banu</i> |
| <i>River. Conservators.</i> | <i>Cork Waterworks.</i> | <i>Exemption. Experiments.</i> | |
| <i>Fry and Smolts. Gratings, Fry Guards, &c.</i> | <i>Lisnafillyn Mills.</i> | <i>Main</i> | |
| <i>River. Mills and Millowners.</i> | <i>Phanis Mill.</i> | <i>Sligo Mills.</i> | <i>Submerged</i> |
| <i>Trough.</i> | | | |

V.

Value of Fisheries. Evidence respecting the great improvement that has taken place in the Irish Fisheries, with particulars of the value of the salmon exports, *Hallett* 3009. 3202-3216—Estimate that the value of the salmon fisheries in Ireland is about 600,000 *l.* a year, *Moore* 3973-3978—Great value of the salmon exports further adverted to; the estimate of 600,000 *l.* represents the retail and not the wholesale price realised, *ib.* 4331-4346. 4411.

Opinion that the salmon fisheries in England are of no particular value, whilst those of Ireland are of a distinctly more valuable character, *Patterson* 6194, 6195.

Value of Fisheries—continued.

Calculation that the Irish salmon fisheries are producing about 600,000 *l.* a year and that at least 10,000 people are employed in them; large expenditure also in Ireland by gentlemen from England who come over for the fishing, *Sir T. Brady* 7083-7088, 7253.

Data for calculation that the value of the Irish salmon fisheries is about 600,000 *l.* a year, *Hornby* 8092-8104.

W.

Water-power (Mills). Explanation that the millers and manufacturers depend solely upon the efficient water-power derived from the rivers, *Arthur* 551, 552, 558, 577—Desire of the millers and manufacturers to conform to any regulations provided the water-power be not diminished, *Arthur* 588, 589, 592; *Robinson* 1333-1336; *Carr* 1574-1576—Absolute necessity for not only a constant but a uniform supply of water to feed the mills, *Wilson* 599-601.

Objection of witnesses, as a millowner, to contribute anything towards the erection of any gratings prejudicial to his water-power, *Giles* 1127-1135; *Sankelton* 1405.

See also *Gratings, &c.* *Mills and Millowners.* *Turbines.*

Webb, Charles James. (Analysis of his Evidence.)—Is a linen manufacturer and bleacher carrying on business at Bandalstown; is a magistrate and is honorary secretary of the County Antimillowners' Association, which was founded in consequence of certain prosecutions commenced in the year 1889; 1-8, 109, 349.

Information respecting the prosecution of witness and other millowners by the Board of Coleraine Conservators with the object of enforcing the erection of gratings and nettings in the mill-race before the turbine wheels, 7-16—Statement that in the year 1873 witness had received a requisition to erect such gratings and nettings, but that the Inspector of Fisheries and withdrawn it as being likely to destroy the water-power, 18-20.

Deterioration of the fishing in the River Main, this being due to the growth of Canadian weed, to poaching, and to the destruction of the salmon by pike, 26-39—Admission that the presence of flax-water in the river is fatal to fish, 40-43—Further reference to the lawsuits issued against witness and to the failure of the prosecutors to prove that any damage had been done to the fish by the turbine wheels, 44-53.

Information as to the number of mills in the district which are worked by water-power; estimate that over 9,000 people depend upon the local industry, 54-56—Evidence as to the manufactures carried on at the various mills; the turn-over value of the goods brought under operation in the case of ten of the largest mills is about 1,300,000 *l.*; 61-72—Explanation of the very great advantages attendant on the use of turbine wheels in the milling business; witness attributes the extension of Irish industries to their introduction, 73-78, 265, 266, 272, 317.

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Z.

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